



U.S. Army Corps of Engineers
Omaha District

Draft ST-14 Second Long-Term Monitoring Report

April 2010 Sampling Event
Contract DACA45-03-D-0032 Task Order 0027

Andrews Air Force Base
Camp Springs, Maryland

June 2010



**CONTRACT DACA45-03-D-0032
TASK ORDER 0027**

**Draft
ST-14 Second Long-Term Monitoring
Report**

**Andrews Air Force Base
Camp Springs, Maryland**

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June 2010

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Date



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List of Acronyms

AFB	Air Force Base
AFCEE	Air Force Center for Engineering and the Environment
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
BTOC	Below Top of Casing
°C	Degrees Celsius
CEI	Comprehensive Environmental Investigation
COC	Chemical of Concern
CT	Carbon Tetrachloride
CVOC	Chlorinated Volatile Organic Compound
DCE	Dichloroethene
DO	Dissolved Oxygen
DPT	Direct Push Technology
DTW	Depth to Water
ERD	Enhanced Reductive Dechlorination
Fe²⁺	Ferrous Iron
IP	Injection Point
LTM	Long-Term Monitoring
MAROS	Monitoring and Remediation Optimization System
MCL	Maximum Contaminant Level
MDE	Maryland Department of Environment
MDL	Method Detection Limit
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
mS/cm	Millisiemens per Centimeter
mV	Millivolt
MW	Monitoring Well
NTU	Nephelometric Turbidity Unit
ORP	Oxidation-Reduction Potential



List of Acronyms (Continued)

PCE	Tetrachloroethene
PDS	Pre-Design Study
PLFA	Phospholipid Fatty Acid
PRG	Preliminary Remediation Goal
QA	Quality Assurance
QC	Quality Control
RI	Remedial Investigation
RL	Reporting Limit
TCE	Trichloroethene
TMP	Temporary Monitoring Points
TOC	Total Organic Carbon
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
UST	Underground Storage Tank
VC	Vinyl Chloride
VOC	Volatile Organic Compound



1.0 Introduction

AECOM has prepared this *Second Long-Term Monitoring (LTM) Report* to describe field and laboratory operations and analytical results during the April 2010 groundwater sampling event. The April 2010 sampling event represents the second semiannual LTM event at Site ST-14, Andrews Air Force Base (AFB), Camp Springs, Maryland (Figure 1-1). The United States Army Corps of Engineers (USACE) contracted AECOM, under Contract No. DACA45-03-D-0032, Contract Task Order No. 0027, to implement performance-based restoration at Sites ST-14 and SS-22, at Andrews AFB, Maryland.

As stated in the *Contract Performance Work Statement for Sites ST14 and SS22 at Andrews AFB* (June 2005), the performance objectives for Site ST-14 are to:

- Prevent further migration of the plume;
- Eliminate/treat identified source areas; and
- Sufficiently treat and demonstrate degradation of contaminants in groundwater, i.e., return groundwater to beneficial use (equal to or less than the maximum contaminant levels [MCLs]) within 20 to 30 years.

These performance objectives will be achieved through the implementation of the approved remedy, in-situ biodegradation and injection of carbon substrate with LTM, at Site ST-14.

1.1 Purpose

AECOM implemented the approved remedial action at Site ST-14 in October 2007. Remedial construction included installation of 195 injection points (IPs) and 24 monitoring points in accordance with the layout provided in the *Final Remedial Design Report* (Earth Tech, 2007d). Injection of sodium lactate was first performed at three areas during the Pre-Design Study (PDS) in 2006 to prove the effectiveness of the remedy and aid with determining the appropriate design parameters.

The purpose of this LTM event was to monitor concentration trends of trichloroethene (TCE); its breakdown products *cis*-1,2-dichloroethene (DCE) and vinyl chloride (VC); carbon tetrachloride (CT); and benzene, toluene, ethylbenzene, and xylenes (BTEX). The analytical and field parameter data collected during this and previous LTM events has been utilized to illustrate trends in dissolved groundwater concentrations of chemicals of concern (COC) and demonstrate the effectiveness of the implemented remedy.

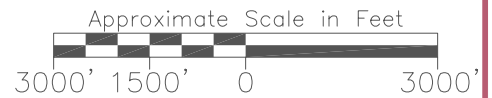
Through April 2010, AECOM completed ten sodium lactate injection events at Site ST-14. The eighth, ninth, and tenth sodium lactate injection events included 14 new injection points installed in locations where reductions in TCE concentrations had not been achieved to date. The effects of these supplemental remedial actions are documented in this LTM report.

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 Plot File Date Created: Jun/08/2010 3:17 PM
 Layout-Sheet Name: LAYOUT1 (2)
 Filename: P:\89023 ANDREWS PBR\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 8\FIGURES\FIG 1-1 SITE LOCATION.DWG



APPROXIMATE
 BOUNDARY OF
 ST-14

ANDREWS AFB, MD



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 APP BY:
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**Andrews AFB - Camp Springs, MD
 ST-14 Second Long-Term
 Monitoring Report**

**Figure 1-1
 Site ST-14 Location**

REV	DESCRIPTION	DRN	CHK	DATE (M/Y)

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	Fig 1-1 Site Location.dwg
SHEET NO.	
DRAWING NO.	



1.2 Scope

The activities conducted as part of this LTM event included:

- Sampling of 38 groundwater monitoring wells, temporary monitoring points (TMPs), and injection points (IPs), and three surface water locations (Figure 1-2);
- Laboratory analysis of the collected samples;
- Third party validation of the laboratory results for volatile organic compounds (VOCs);
- Evaluation of the laboratory results; and
- Preparation of this report with conclusions drawn from the analysis.

The sampling activities followed protocols presented in the *Site-Specific Safety and Health Plan (ST-14 and SS-22)* (Earth Tech, 2006a) and the *Field Sampling Plan for the Remedial Design/Remedial Action, ST-14 and SS-22* (Earth Tech, 2006b) for Andrews AFB.



2.0 Site History

The main base portion of Andrews AFB constitutes approximately 4,360 acres in northwestern Prince George's County, Maryland, and is located approximately 5 miles southeast of the District of Columbia. The Base has been in operation since the 1940s. Site ST-14 is located in the northeast portion of Andrews AFB, extending to the east and west of Perimeter Road (Refer to Figure 1-1). A full service fueling station with two bays was built on the Site in 1945. The gas station was closed and converted into a convenience store (the "Shoppette") in the early 1980s. The Cabin Branch creek, located north of the site, receives groundwater discharge from the surficial aquifer via seeps along its southern bank.

In 1983, the Maryland Department of the Environment (MDE) issued a Consent Order for the removal of two 10,000-gallon gasoline underground storage tanks (USTs). The two 10,000-gallon USTs, a 250-gallon waste motor oil UST, and petroleum-contaminated soil were removed from the site between 1983 and 1986. United States Geological Survey (USGS) investigations conducted between 1988 and 1989 confirmed the presence of BTEX contamination in the groundwater at Site ST-14. In 1992, a groundwater investigation conducted by Dames & Moore (D&M, 1992) reconfirmed the BTEX plume and identified the presence of TCE and CT plumes in groundwater at Site ST-14, originating upgradient (southwest) of the Former East Side Gas Station. In 1993, a 1,000-gallon steel UST containing No. 2 fuel oil was removed near Building 3471 (near Patrick Avenue). The Comprehensive Environmental Investigation (CEI), completed as part of the Remedial Investigation (RI) between April 1999 and November 2000, indicated that the TCE plume extended from the water table, located 15 to 20 feet below ground surface (bgs), to the Calvert Formation, a clay aquitard located at 38 to 40 feet bgs.

A lack of tetrachloroethene (PCE) detections in the site's groundwater led previous investigators to presume that TCE was the original contaminant and not a metabolic breakdown (i.e., daughter) product of PCE. This presumption is further supported by the fact that Andrews AFB widely used TCE as a degreaser through the 1960s. Two fire department wash sites, a former aircraft wash rack, and a former vehicle wash rack are all located within the boundary of Site ST-14 and represent potential sources of TCE contamination. These source areas were investigated in the *Final CEI* (IT, 2000). Contaminant concentrations in groundwater exceeded the federal MCLs for several compounds. However, analyses of surface water samples indicated that contaminant concentrations were less than applicable water quality standards or were not detectable. This has been attributed to volatilization and/or dilution of organic contaminants in surface water (Earth Tech, 2007d). The contaminant concentrations found in soil samples were not indicative of a continuing source for groundwater contamination.



3.0 Summary of Remedial Activities

AECOM designed remedial activities at Site ST-14 to address several TCE/CT contaminated areas within the site and BTEX in the northeast area of the site. To address TCE/CT contamination at Site ST-14, AECOM utilized enhanced reductive dechlorination (ERD) via injection of a carbon substrate (i.e., sodium lactate). Reductive dechlorination is the principal mechanism for transformation of chlorinated volatile organic compounds (CVOCs) under anaerobic conditions. Addition of a carbon substrate, such as sodium lactate, to the subsurface provides a growth substrate for the nitrate-reducing bacteria, sulfate-reducing bacteria, and methanogens required to create anaerobic conditions. Under such conditions, these microorganisms dechlorinate and reduce TCE to its intermediate metabolites, DCE and VC. These daughter products further reduce to ethene under aerobic conditions. CT also reduces under anaerobic conditions to chloroform. This metabolic pathway includes methylene chloride, methyl chloride, and methane.

To address the BTEX contamination in the northeast portion of Site ST-14, AECOM utilized enhanced biodegradation through injection of an oxygen-releasing compound (i.e., PermeOx[®] Plus). Through injection of an oxygen-releasing compound, AECOM intended to introduce additional electron acceptors to the system and accelerate the aerobic degradation of the contaminants.

Between May and October 2006, AECOM conducted a PDS to demonstrate the effectiveness of ERD. Section 3.1 briefly describes the PDS. The *Final Site ST-14 Remedial Design Report* (Earth Tech, 2007d) provides additional details of the remedial methods employed. Section 3.2 describes the full-scale sodium lactate injection events and Section 3.3 describes the PermeOx[®] Plus injection event.

3.1 Pre-Design Study Sodium Lactate Injections

In order to evaluate the effectiveness of ERD by injection of an organic carbon substrate (i.e., sodium lactate), AECOM conducted a 6-month PDS at three test areas, previously determined to be “hot spots” within the site. The PDS included installation of injection and monitoring wells, three injection events, and three groundwater sampling events. The *Final PDS Report* (Earth Tech, 2007a) includes details of all PDS activities. Following each injection round, AECOM monitored changes in total organic carbon (TOC), geochemical conditions, and microbial population to verify the development and maintenance of anaerobic, carbon-rich conditions that would be conducive to ERD. During the course of the PDS period, periodic injections of sodium lactate maintained elevated TOC concentrations at injection and monitoring points. The ERD process depleted dissolved oxygen (DO) following the injections, progressively establishing a stable reductive anaerobic treatment zone over 6 months that extended 15 to 20 feet downgradient from the injection points. Depletion of nitrate and a dramatic increase in methane (evidence of nitrate-reducing bacteria and methanogens) confirmed the presence of an anaerobic zone. Additionally, phospholipid fatty acid (PLFA) analyses indicated an increase in microbial biomass in the test areas.



Following substrate injection, reductions in TCE concentrations were observed in most monitoring wells, though changes in reduced daughter products (i.e., DCE and VC) were more variable. Concentrations of *cis*-1,2-DCE increased in all wells in Test Area 1, did not change significantly in the wells in Test Area 2, and decreased in all wells in Test Area 3. VC was only detected in one well (in Test Area 1) following substrate injections.

3.2 Full Scale Sodium Lactate Injections

Based on the results of the PDS and observed groundwater flow, AECOM planned substrate injections to create semi-passive bioreactive barriers (i.e., biobarriers) with anaerobic condition at fixed intervals. Within the biobarriers, anaerobic conditions promoted reductive dechlorination of TCE and CT, while intermediate metabolites further biodegraded in the aerobic intervals. Figure 3-1 illustrates the placement of the injection barriers and Figure 3-2 presents groundwater potentiometric contours based on the groundwater levels collected during the April 2010 LTM event. AECOM originally constructed seven barriers within the site, each with a number of injection wells ranging from eight injection wells on Barrier 6 to 49 injection wells in Barrier 2. In July 2009, AECOM installed three additional smaller barriers in three hotspots (Barriers 8 through 10). Table 3-1 summarizes the sodium lactate injection events that have occurred to date.

Following the first and second sodium lactate injection events, the numbers and locations of wells injected, AECOM determined the injection volumes, and strength of sodium lactate solution based on analytical lab results including concentrations of TCE and TOC, and geochemical field parameters including DO and oxidation-reduction potential (ORP). During the second injection event, conducted between December 2007 and January 2008, construction activities at Andrews AFB prohibited AECOM from injecting sodium lactate into the injection points in Barrier 7.

During the third injection event conducted in February and March 2008, and each subsequent event thereafter, AECOM excluded Barrier 4 from the injection network due to the observed decrease in TCE concentrations in the downgradient monitoring well. AECOM also excluded Barrier 6 from the injection network in July 2008 due to sufficient concentrations of residual TOC. AECOM altered the volume and frequency of injections at Barrier 5 over several injection events to evaluate the effect of substrate volume on residence time of carbon in the aquifer. During the sixth injection event conducted in November 2008, AECOM excluded Barriers 2 and 7 from the injection network due to uncertainty regarding the direction of groundwater flow in the area near Barrier 2 and relatively low TCE concentrations in wells downgradient of Barrier 7.

In July 2009, AECOM installed additional injection points in three hot spots, including the areas upgradient of MW32 (five injection points: 8A01 through 8A02; 8B01 through 8B03), upgradient of MW07 (five injection points: 9A01 through 9A05), and upgradient of MW37 (four injection points: 10A01 through 10A04). AECOM conducted the initial injection event at these Barriers in July 2009 with 250 gallons of 6% sodium lactate solution in each point. AECOM conducted subsequent injections in September and November 2009 at these locations. The September 2009 event also included six injection points within Barrier 3.



**Table 3-1
Sodium Lactate Injection Events Summary**

Sodium Lactate Injection Barrier		1	2	3	4	5	6	7	8	9	10
Injection Event #1 10/10/2007 - 10/31/2007	Strength (%)	6%	6%	6%	6%	6%	6%	6%	Not Installed	Not Installed	Not Installed
	Volume (gallon)	250	250	250	250	250	250	250			
	Injection Points	A/B all	A/B all	A/B all	A/B all	A/B all	A/B all	A			
Injection Event #2 12/6/2007 - 1/8/2008	Strength (%)	6%	6%	6%	6%	6%	6%	No Injection	Not Installed	Not Installed	Not Installed
	Volume (gallon)	250	250	250	250	250	250				
	Injection Points	A/B all	A/B all	A/B all	A/B all	A/B all	A/B all				
Injection Event #3 2/8/2008 - 3/5/2008	Strength (%)	6%	6%	9%	No Injection	6%	6%	6%	Not Installed	Not Installed	Not Installed
	Volume (gallon)	250	250	250		500	250	250			
	Injection Points	A/B all	A/B all	A/B all		A/B all	A/B all	A			
Injection Event #4 4/17/2008 - 5/2/2008	Strength (%)	6%	6%	9%	No Injection	No Injection	6%	6%	Not Installed	Not Installed	Not Installed
	Volume (gallon)	250	250	250		250	250				
	Injection Points	A/B all	A/B all	A/B 1-15		A/B all	A				
Injection Event #5 7/21/2008 - 7/31/2008	Strength (%)	6%	6%	6%	No Injection	6%	No Injection	6%	Not Installed	Not Installed	Not Installed
	Volume (gallon)	250	250	250		500		250			
	Injection Points	A only	A/B all	A/B 1-15		B only		A			
Injection Event #6 11/17/2008 - 11/25/2008	Strength (%)	6%	No Injection	6%	No Injection	6%	6%	No Injection	Not Installed	Not Installed	Not Installed
	Volume (gallon)	250		250		500	250				
	Injection Points	A/B 8-18		A/B 1-15		B only	A/B all				
Injection Event #7 6/18/2009 - 6/19/2009	Strength (%)	6%	No Injection	No Injection	No Injection	6%	6%	No Injection	Not Installed	Not Installed	Not Installed
	Volume (gallon)	250		250		250					
	Injection Points	4 points		4 points		4 points					
Injection Event #8 7/13/2009 - 7/14/2009	Strength (%)	No Injection	No Injection	No Injection	No Injection	No Injection	No Injection	No Injection	6%	6%	6%
	Volume (gallon)								250	250	250
	Injection Points								A/B all	A	A



Table 3-1
Sodium Lactate Injection Events Summary (Continued)

Sodium Lactate Injection Barrier		1	2	3	4	5	6	7	8	9	10
Injection Event #9 9/18/2009 - 9/22/2009	Strength (%)	No Injection	No Injection	6%	No Injection	No Injection	No Injection	No Injection	6%	6%	6%
	Volume (gallon)			250					250	250	
	Injection Points			6 points					A/B all	A	A
Injection Event #10 11/18/2009 - 11/19/2009	Strength (%)	No Injection	No Injection	No Injection	No Injection	No Injection	No Injection	No Injection	6%	6%	6%
	Volume (gallon)			250					250	250	
	Injection Points			A/B all					A	2 points	



3.3 Emulsified Vegetable Oil Substrate Injections

AECOM performed a single injection event at ST-14 using EOS[®] (an emulsified vegetable oil organic carbon substrate) between May 17 and June 4, 2010 utilizing the existing sodium lactate injection barriers. AECOM selected EOS[®] as the injection substrate because it is a relatively slow-release organic carbon substrate, resulting in a longer residence time in the aquifer than sodium lactate. The EOS[®] injection event was the last injection event to be performed by AECOM at ST-14, and encompassed a majority of the IPs at ST-14. AECOM injected approximately 250 gallons of substrate solution into each injection point. In areas where concentrations in nearby monitoring wells (based on the October 2009 LTM event, the most recent available data when the event was planned) indicated that TCE was still elevated and/or statistically declining trends had not yet been established, a higher concentration (6 percent) of substrate was injected. In areas where groundwater concentrations of TCE had already been reduced to levels at or below MCLs because of previous substrate injections at ST-14, a lower concentration (4 percent) of substrate was injected. Table 3-2 summarizes the EOS[®] injection event at ST-14. AECOM submitted a technical memorandum, which provides complete details of the injection event, to Andrews AFB and USACE dated June 10, 2010 as documentation of this supplemental remedial action.

3.4 PermeOx[®] Plus Injections

PermeOx[®] Plus is a timed-release calcium peroxide powder that mixes with water to form a slurry. This substrate provides a source of oxygen to the system intended to enhance aerobic biodegradation of BTEX compounds. Based on the manufacturer's (FMC Corporation) laboratory studies, PermeOx[®] Plus has an estimated time-release period of 1 year. This approximation is based on laboratory data; field results will vary slightly based on site-specific conditions.

AECOM performed 40 PermeOx[®] Plus injections October 10–18, 2007 using direct push technology (DPT). Figure 3-3 illustrates the injection grid layout. The drilling team, supervised by AECOM personnel, advanced the DPT injections to a depth of 32 feet bgs and then raised them in 1-foot increments until the injection head reached a depth of 19 feet bgs. The slurry consisted of 120 pounds of PermeOx[®] Plus and 120 gallons of water for each injection point; in total, approximately 4,800 pounds of PermeOx[®] Plus were injected into the subsurface. Through enhanced aerobic bioremediation of BTEX in this area, AECOM intended to promote aerobic co-metabolism of TCE.

In July 2009, AECOM completed ten additional DPT PermeOx[®] Plus injections in the vicinity of MW10 and MW04, an area in which concentrations of BTEX had been declining, but field measurements of DO and ORP indicated that aquifer conditions had returned to an anaerobic state. In May 2010, AECOM completed eight additional DPT PermeOx[®] Plus injections between MW04 and MW10. AECOM documented this supplemental remedial action in a technical memorandum dated June 10, 2010. Figure 3-3 illustrates the locations of these injections.

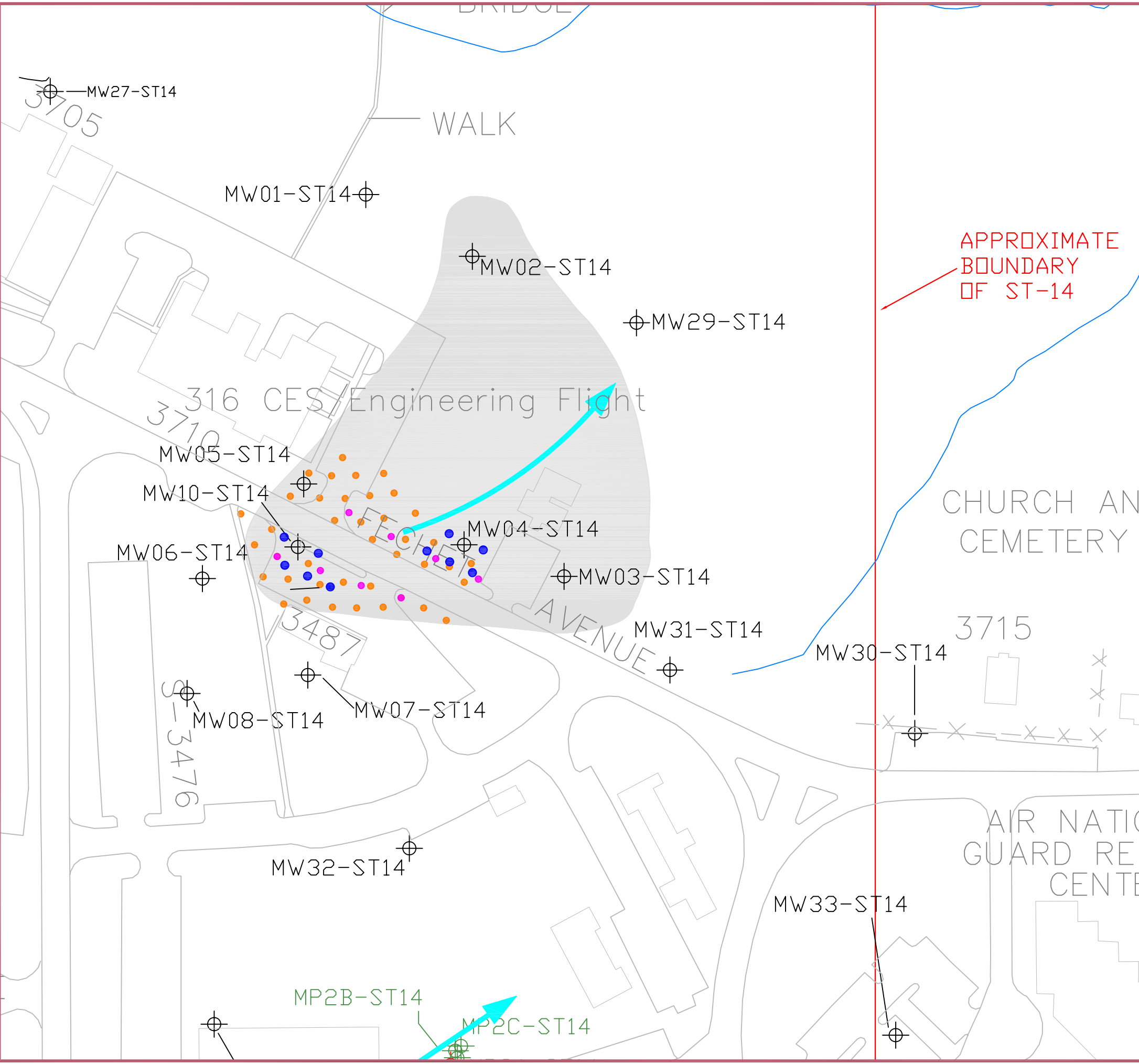


Table 3-2
EOS[®] Injection Events Summary

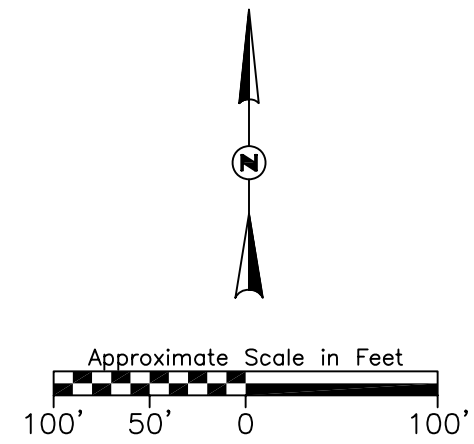
Injection Barrier		1	2	3	4	5	6	7	8	9	10
5/17/2010 – 6/4/2010	Strength (%)	4%	6%	4% & 6% ¹	4%	6%	6%	No Injection	6%	4%	6%
	Volume (gallon)	250	250	250	250	250	250		250	250	250
	Injection Points	A/B 6-18	A/B 1-20	A/B 3-22	A/B 5-15	A/B all	A/B all		A all	A/B all	A 3-4

¹ IPs 3A05 through 3A09 and 3B05 through 3B09 received a 4% EOS[®] solution. Most remaining IPs in Barrier 3 received a 4% EOS[®] solution. Refer to the Technical Memorandum (AECOM, 2010) dated June 10, 2010 for complete details.

Plotted By: mrcallyad
 Plot File Date Created: Jun/21/2010 9:42 AM
 Layout-Sheet Name: LAYOUT1
 Filename: P:\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 8\FIGURES\FIG 3-3 PERMEOX INJECTION GRID.DWG



- LEGEND**
- PermeOx Plus DPT INJECTION POINT - OCTOBER 2007
 - PermeOx Plus DPT INJECTION POINT - JULY 2009
 - PermeOx Plus DPT INJECTION POINT - MAY 2010
 - ⊕ MONITORING WELL
 - GROUNDWATER FLOW DIRECTION
 - PROPOSED BENZENE TREATMENT AREA USING ENHANCED IN-SITU AEROBIC BIODEGRADATION SYSTEM



REV	DESCRIPTION	DRN	CHK	DATE (MM/YY)

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ST-14 Second Long-Term Monitoring Report
Camp Springs, MD

Figure 3-3
 PermeOx Plus Injection Grid Layout

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	Fig 3-3 PermeOx Injection Grid.dwg
SHEET NO.	
DRAWING NO.	



4.0 Project Activities

The following sections summarize activities conducted during the April 2010 sampling event. Section 4.1 provides a detailed timeline of project activities. Section 4.2 outlines the groundwater sampling procedures. Section 4.3 summarizes the rationale for selecting the analyses performed on groundwater samples collected during the investigation. Section 4.4 provides a review of the analysis of field and laboratory data.

4.1 Project Timeline

The following timeline describes the remedial and monitoring activities at Site ST-14 to date:

February 2006	Installation of IPs and monitoring points for PDS
March 2006	Baseline Groundwater Sampling Event
May 2006	PDS Sodium Lactate Injection Event #1 at Test Areas 1, 2, and 3
June 2006	Groundwater Sampling Event #1
July 2006	PDS Sodium Lactate Injection Event #2 at Test Areas 1 and 2
August 2006	Groundwater Sampling Event #2
September 2006	PDS Sodium Lactate Injection Event #3 at Test Areas 1, 2, and 3
October 2006	Groundwater Sampling Event #3
June 2007	Submission of <i>Final PDS Report</i> (Earth Tech, 2007a)
September 2007	Submission of <i>Final Record of Decision</i> (Earth Tech, 2007c)
Sept. – Oct. 2007	Installation of additional injection wells and TMPs
October 2007	PermeOx [®] Plus Injections
October 2007	Sodium Lactate Injection Event #1
Oct. – Nov. 2007	Groundwater Sampling Event
December 2007	Sodium Lactate Injection Event #2
January 2008	Groundwater Sampling Event
Feb. – Mar. 2008	Sodium Lactate Injection Event #3
Mar. – April 2008	First Quarterly Performance Monitoring Event
April – May 2008	Sodium Lactate Injection Event #4
June – July 2008	Second Quarterly Performance Monitoring Event
July 2008	Sodium Lactate Injection Event #5
September 2008	Submission of <i>Draft Interim Remedial Action Completion Report</i> (Earth Tech, 2008)
October 2008	Third Quarterly Performance Monitoring Event
November 2008	Sodium Lactate Injection Event #6



January 2009	Fourth Quarterly Performance Monitoring Event
February 2009	Installation of additional TMPs
April 2009	Fifth Quarterly Performance Monitoring Event
May 2009	Survey of TMP elevations and site-wide gauging event
June 2009	Sodium Lactate Injection Event #7
July 2009	Supplemental PermeOx [®] Plus Injections
July 2009	Installation of additional sodium lactate injection wells
July 2009	Sodium Lactate Injection Event #8
July 2009	Sixth Quarterly Performance Monitoring Event
September 2009	Sodium Lactate Injection Event #9
October 2009	First Semiannual LTM Event
November 2009	Sodium Lactate Injection Event #10
January 2010	Collection of groundwater samples at MW32 and MW37
April 2010	Second Semiannual LTM Event
May – June 2010	EOS [®] Injection Event

4.2 Field Activities

Field activities conducted during the second semiannual LTM event in April 2010 included:

- Measurement of groundwater levels and field parameters in 38 sampling points, and
- Collection of groundwater samples for analysis from 37 sampling points and 3 surface water sampling locations.

The 38 sampling points included 30 monitoring wells, 4 TMPs, and 4 IPs.

AECOM followed protocols for groundwater sampling methods presented in the *Site-Specific Safety and Health Plan (ST-14 and SS-22)* (Earth Tech, 2006a) and the *Field Sampling Plan for the Remedial Design/Remedial Action, ST-14 and SS-22* (Earth Tech, 2006b).

Groundwater sampling procedures included the following:

- Measurement of groundwater levels with a water level meter;
- Purging of monitoring wells using low flow (minimum drawdown) sampling;
- Measurement of field-recorded parameters (including temperature, pH, specific conductance, ORP, DO, turbidity, and ferrous iron [Fe^{2+}]) during monitoring well purging; and



- Collection of groundwater samples from the purged monitoring wells using the low-flow sampling method presented in the *Field Sampling Plan for the Remedial Design/Remedial Action, ST-14 and SS-22* (Earth Tech, 2006b).

AECOM completed groundwater purging and sampling with QED SamplePro[®] bladder pumps with MicroPurge[®] control boxes and compressors. Field personnel recorded field parameters using an In-Situ[®] Troll 9500 or Horiba U-22 water quality meter. Refer to the *Site-Specific Safety and Health Plan (ST-14 and SS-22)* (Earth Tech, 2006a) and the *Field Sampling Plan for the Remedial Design/Remedial Action, ST-14 and SS-22* (Earth Tech, 2006b) for detailed descriptions of all sampling activities and protocols.

Field personnel decontaminated measuring and purging equipment according to the specifications in Section 5.0 of the *Field Sampling Plan for the Remedial Design/Remedial Action, ST-14 and SS-22* (Earth Tech, 2006b) and Section 5.0 of the *Installation-wide Sampling and Analysis Plan* (IT, 2002).

4.3 Sample Analysis

Based on the *Final Remedial Design Report* (Earth Tech, 2007d) for Site ST-14, the principal COCs at the site include TCE, CT, and BTEX. Potential sources of contamination include two fire department wash sites, a former aircraft wash rack, and a former vehicle wash rack where historical documents indicate the use of TCE as a degreaser. AECOM considered the chosen remedial action (i.e., injection of sodium lactate solution into the subsurface to enhance reductive dechlorination of CVOCs and injection of PermeOx[®] Plus into the subsurface to enhance aerobic degradation of BTEX) as most appropriate for further removal and treatment of the COCs at this site. AECOM specified LTM as part of the remedial action at Site ST-14 to confirm that contaminant concentrations are declining over time because of the remedial activities. Trend analysis of the sampling data will help determine if conditions at ST-14 require supplemental remedial activities.

AECOM subcontracted laboratory analysis of collected samples to Microbac Laboratories in Marietta, Ohio. Table 4-1 lists the analysis methods and number of samples (including quality assurance/quality control [QA/QC] samples) collected for each analysis. Figure 1-2 illustrates the monitoring wells, TMPs, and IPs sampled during the April 2010 LTM event. Appendix A includes the analytical laboratory data from the volatile organic compound (VOC) analysis. Appendix B includes the analytical laboratory data from the TOC, gasses, nitrates, alkalinity, sulfate, and metals analyses. Appendix C includes the analytical laboratory data from the PLFA analysis.

AECOM collected QA/QC samples as described in the *QA/QC Plan* (Earth Tech, 2006c). VALIDATA, located in Duluth, Georgia, conducted third party validation of the laboratory data.

4.4 Quality Assurance/Quality Control

Table 4-2 lists the analytical methods, method detection limits (MDLs), and reporting limits (RLs) for VOCs reported above detection limits.



The analytical laboratory applied data flags to the analytical data. During the data review process, VALIDATA and AECOM reviewed the analytical data and associated data flags, and assigned data qualifiers per the guidelines given in the Air Force Center for Engineering and the Environment (AFCEE) *Quality Assurance Project Plan, Version 4.0.02* (AFCEE, 2006). VALIDATA assigned the following data qualifiers to the data through the data validation process:

- **J** The analyte was positively identified, but the quantitation is an estimated value.
- **U** The analyte was analyzed, but not detected. The associated numerical value is at or below the MDL.
- **R** The data are unusable. The analyte may or may not be present.

Table 4-1 lists the numbers of QA/QC samples, including equipment blanks, ambient blanks, matrix spike (MS) and matrix spike duplicates (MSD), trip blanks, and field duplicates.



Table 4-1
Sample Analysis Summary

Analysis	Method	Matrix	# Samples	# Equipment Blanks	# Ambient Blanks	# MS/MSDs	# Trip Blanks	# Field Duplicates	Total # Samples
VOCs	8260B	GW	38	3	1	1	5	2	50
VOCs	8260B	SW	3	0	0	0	1	0	4
TOC	E415.1	GW	30	0	0	0	0	0	30
TOC	E415.1	SW	3	0	0	0	0	0	3
Gases	RSK 175	GW	30	0	0	0	0	0	30
NO3/NO2	E353.2	GW	30	0	0	0	0	0	30
Alkalinity	E310.2	GW	30	0	0	0	0	0	30
Sulfate	E375.4	GW	30	0	0	0	0	0	30
Metals	6010B	GW	30	0	0	0	0	0	30

MS/MSD = Matrix Spike/Matrix Spike Duplicate

TOC = Total Organic Carbon

VOC = Volatile Organic Compound

GW = Groundwater

SW = Surface Water



**Table 4-2
Analytical Parameters, Method Detection Limits, and Reporting Limits**

Parameter/Method	Analyte	Water		
		MDL	RL	Units
VOCs/SW-846 8260B	1,1,1-Trichloroethane	0.250	1.00	µg/L
	1,1-Dichloroethane	0.125	1.00	µg/L
	1,1-Dichloroethene	0.500	1.00	µg/L
	1,2,3-Trichlorobenzene	0.150	1.00	µg/L
	1,2,4-Trimethylbenzene	0.250	1.00	µg/L
	1,2-Dibromoethane	0.250	1.00	µg/L
	1,2-Dichlorobenzene	0.125	1.00	µg/L
	1,2-Dichloropropane	0.200	1.00	µg/L
	1,3,5-Trimethylbenzene	0.250	1.00	µg/L
	1,4-Dichlorobenzene	0.125	0.50	µg/L
	Acetone	2.500	10.00	µg/L
	Benzene	0.125	0.400	µg/L
	Bromoform	0.500	1.000	µg/L
	Bromomethane	0.500	3.000	µg/L
	Carbon Tetrachloride	0.250	1.000	µg/L
	Chlorobenzene	0.125	0.500	µg/L
	Chloroform	0.125	0.300	µg/L
	cis-1,2-Dichloroethene	0.250	1.00	µg/L
	Dibromochloromethane	0.250	0.50	µg/L
	Ethylbenzene	0.250	1.00	µg/L
	Isopropylbenzene	0.250	1.00	µg/L
	m,p-Xylene	0.500	2.00	µg/L
	Methyl Ethyl Ketone	2.50	10.0	µg/L
	Methyl Isobutyl Ketone	2.50	10.0	µg/L
	Methylene Chloride	0.250	1.00	µg/L
	Naphthalene	0.200	1.00	µg/L
	n-Butylbenzene	0.250	1.00	µg/L
	n-Propylbenzene	0.125	1.00	µg/L
	o-Xylene	0.250	1.00	µg/L
	p-Cymene	0.250	1.00	µg/L
	sec-Butylbenzene	0.250	1.00	µg/L
	t-Butylbenzene	0.250	1.00	µg/L
tert-Butyl Methyl Ether	0.500	5.00	µg/L	



Table 4-2
Analytical Parameters, Method Detection Limits, and Reporting Limits (Continued)

Parameter/Method	Analyte	Water		
		MDL	RL	Units
VOCs/SW-846 8260B	Tetrachloroethene	0.250	1.00	µg/L
	Toluene	0.250	1.00	µg/L
	trans-1,2-Dichloroethene	0.250	1.00	µg/L
	Trichloroethene	0.250	1.00	µg/L
	Trichlorofluoromethane	0.250	1.00	µg/L
	Vinyl Chloride	0.250	1.00	µg/L

MDL = Method Detection Limit
µg/L = Micrograms per Liter
RL = Reporting Limit



5.0 Monitoring Results

This section presents the laboratory analytical results and a preliminary analysis of identified COCs. AECOM generated the COC plume maps (Figures 5-1, 5-2, 5-3, and 5-4) using Surfer[®], a software package that generates concentration contours based on site data input by the user. The accuracy of the plume maps created by Surfer[®] increases with the quantity and density of concentration data points. The program's algorithm generates approximate plumes for Site ST-14 based on the contaminant concentrations measured at the monitoring wells and TMPs during the sampling event. Additionally, AECOM reviews and revises the contours manually to account for discrepancies in the concentration data and the automatically generated contour lines.

5.1 Data Summary

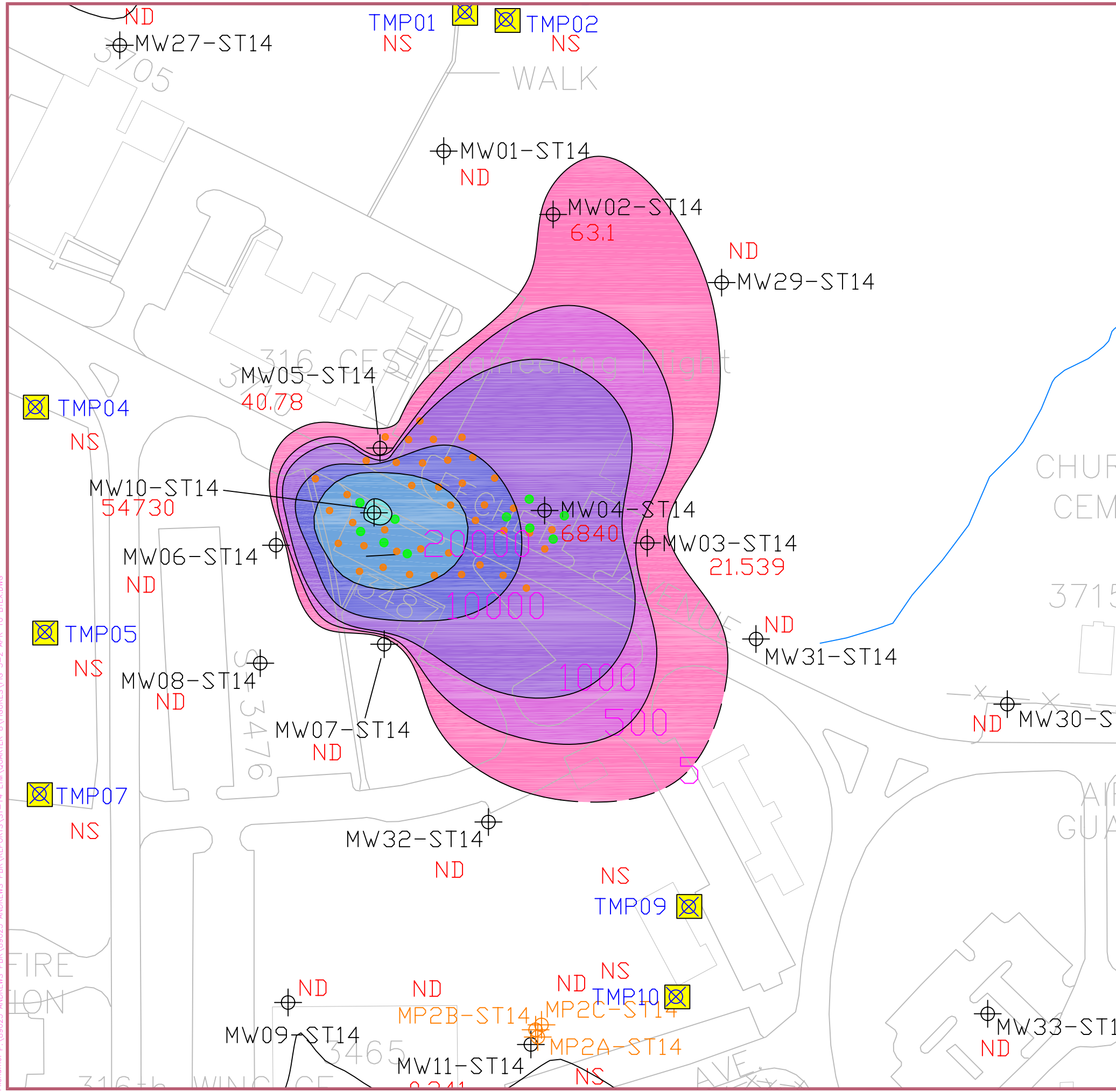
Figure 1-2 illustrates the locations of the monitoring wells and TMPs sampled during the April 2010 sampling event. Appendix A presents a summary of the VOC concentrations found in the groundwater samples during the April 2010 sampling event. Appendix B presents a summary of the monitored natural attenuation parameter concentrations. Appendix C presents a summary of the PLFA results obtained during each sampling event at Site ST-14. Appendix D presents a summary of key field parameters and chemical concentrations during each sampling event conducted at Site ST-14, inclusive of monitoring wells, PDS wells, TMPs, and IPs.

5.2 Summary of Field Parameters

Table 5-1 presents a summary of the field parameters measured during the April 2010 sampling event. The field parameters represent the standard low-flow stabilized values measured just prior to sample collection and include temperature, specific conductivity, DO, pH, ORP, turbidity, and ferrous iron. Appendix D presents field parameter data from each sampling event conducted at Site ST-14, as well as concentrations of select geochemical indicators and COCs.

ERD Treatment Area: Anaerobic conditions (i.e., DO is below 1.0 milligrams per liter [mg/L]) are present in some of the monitoring wells and TMPs within the active ERD treatment areas, indicating favorable conditions for ERD. These wells include MW11, MW15, MW17, MW23, MW24, MW32, MW34, TMP25, TMP26, TMP27, and TMP28. Monitoring locations that were not anaerobic during the April 2010 sampling event but are located in areas where AECOM has injected sodium lactate include MW12, MW13, MW19, and MW37. Prior to the April 2010 LTM event, AECOM last completed sodium lactate injections in the Barriers 8, 9, 10, and a portion of Barrier 3 in November 2009. Several of the other barriers had not received sodium lactate injections since July 2009 or November 2008 because of elevated TOC concentrations and decreased TCE concentrations. Because of decreasing or non-detect TCE concentrations in these areas, aerobic conditions do not present a cause for concern. Aerobic conditions (i.e., DO is above 1.0 mg/L) are generally present in areas that have not received sodium lactate injections.

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 Plot File Date Created: Jun/09/2010 10:39 AM
 Layout-Sheet Name: LAYOUT1
 Filename: P:\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 8\FIGURES\FIG 5-2 APR 10 BTEX.DWG



LEGEND

- MW03-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- PermeX PLUS INJECTION POINT, OCTOBER 2007
- PermeX PLUS INJECTION POINT, JULY 2009
- 165.11 TOTAL BTEX CONCENTRATION IN ug/L, APRIL 2010
- 5-500 ug/L BTEX
- 500-1000 ug/L BTEX
- 1000-10000 ug/L BTEX
- 10000-20000 ug/L BTEX
- 20000-50000 ug/L BTEX
- 50000+ ug/L BTEX
- PROJECTED CONTOUR (LIMITED DATA)

NOTES:

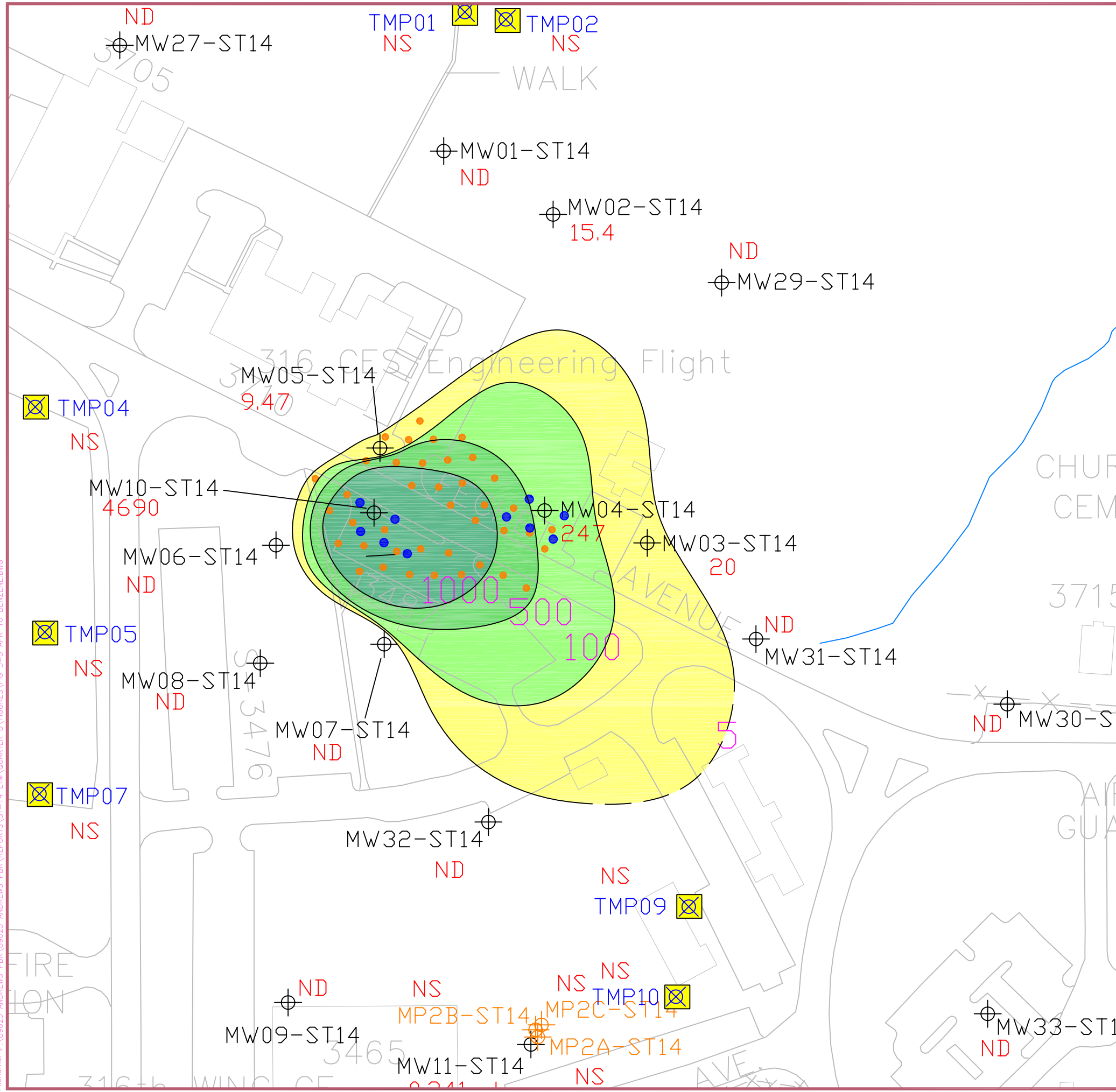
ND = Non Detect
 NS = Not Sampled
 PDS = Pre-Design Study

Total BTEX is the sum of benzene, toluene, ethylbenzene, m,p-xylenes and o-xylenes.

Approximate Scale in Feet

<p>675 N. Washington St, Suite 300 Camp Springs, MD 21044 T 703.549.8728 F 703.549.9134 WWW.AECOM.COM</p>	
<p>Andrews AFB ST-14 Second Long-Term Monitoring Report Camp Springs, MD</p>	
<p>Figure 5-2 BTEX Isoconcentration Contours - April 2010</p>	
PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	Fig 5-2 Apr 10 BTEX.dwg
SHEET NO.	
DRAWING NO.	

Plotted By: mrcallyad
 Plot File Date Created: Jun/09/2010 10:56 AM
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 Filename: P:\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 8\FIGURES\FIG 5-3 APR 10 BENZENE.DWG

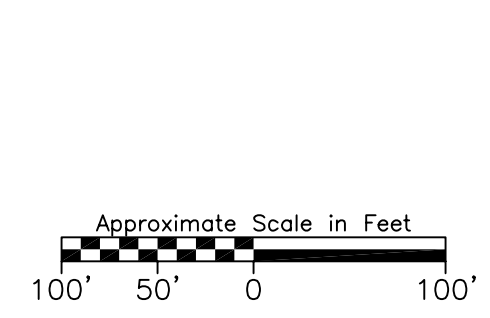


- ### LEGEND
- MW03-ST14 MONITORING WELL
 - MP3C-ST14 PDS INJECTION OR MONITORING POINT
 - Permeameter PLUS INJECTION POINT, OCTOBER 2007
 - Permeameter PLUS INJECTION POINT, JULY 2009
 - 165.11 BENZENE CONCENTRATION IN ug/L, APRIL 2010

- 5-100 ug/L BENZENE
- 100-500 ug/L BENZENE
- 500-1000 ug/L BENZENE
- 1000+ ug/L BENZENE

PROJECTED CONTOUR (LIMITED DATA)

NOTES:
 ND = Non Detect
 NS = Not Sampled
 PDS = Pre-Design Study



DRN	DES BY:	CHK BY:	APP BY:	REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

675 N. Washington St., Suite 300
 Camp Springs, MD 21044
 T 703.549.8728 F 703.549.9134
 WWW.AECOM.COM

Andrews AFB
ST-14 Second Long-Term Monitoring Report
Camp Springs, MD

Figure 5-3
 Benzene Isoconcentration Contours - April 2010

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	Fig 5-3 Apr 10 Benzene.dwg
SHEET NO.	
DRAWING NO.	



**Table 5-1
April 2010 Field Parameters Summary**

Loc ID	Date	Temperature (°C)	Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Fe ²⁺ (mg/L)
MW01 ¹	04/08/10	17.3	0.37	0	3.98	389	382	0
MW02 ¹	04/08/10	12.35	0.31	1.15	4.4	384	14.2	0
MW03 ¹	04/06/10	10.56	0.999	3.55	4.77	284	25.2	0
MW03-3471	04/08/10	16.69	0.427	2.91	6.17	-64	0	NA
MW04 ¹	04/06/10	10.14	1.24	1.33	7.06	-122	34	5.2
MW05 ¹	04/08/10	15.44	0.285	0.68	5.9	121	1.5	0.1
MW06 ¹	04/05/10	16.59	0.187	4.48	6.14	180	38.5	0.2
MW07	04/09/10	6.21	0.281	6.26	6.19	340	65.3	0.6
MW08	04/05/10	14.66	0.547	5.28	6.55	181	49.2	0.3
MW09	04/08/10	16.84	0.196	1.99	4.95	227	0	NA
MW10 ¹	04/05/10	22.83	2.92	2.91	6.41	-82	26.6	0
MW11	04/09/10	13.24	2.07	0	7.71	-169	283	2
MW12	04/08/10	20.53	0.317	3.51	6.51	111	0	0
MW13	04/09/10	8.15	1.48	7.8	8.17	-63	541	NA
MW15	04/06/10	21.63	1.75	0.44	7.36	-25	343	1
MW16	04/07/10	16.99	2.03	0	5.81	-15	12.5	NA
MW17	04/09/10	16.26	1.64	0	6.72	-150	0	NA
MW19	04/08/10	14.02	5.87	2.36	7.65	-185	14.8	6.4
MW22	04/07/10	8.38	NA ²	NA ²	5.83	58	15.5	NA
MW23	04/07/10	22.94	2.93	0	7.59	-208	130	6.6
MW24	04/06/10	19.27	0.12	0	5.28	92	25.3	4.8
MW27	04/07/10	17.56	0.71	0.92	3.8	328	15.6	0
MW29	04/12/10	12.13	0.817	2.1	5.43	249	0	NA
MW30	04/05/10	9.75	0.999	8.91	5.13	356	11	0
MW31 ¹	04/09/10	14.55	2.64	5.5	4.39	222	0	0
MW32	04/07/10	16.24	0.26	0	6.34	-74	4.3	5.2
MW33	04/07/10	10.79	0.331	3.9	3.9	354	0	0.1
MW34	04/05/10	10.26	1.37	0.51	5.82	68	21.6	2.5
MW35	04/06/10	11.33	2.58	10.34	14+	-53	22.4	0
MW37	04/07/10	20.34	0.953	3.03	5.87	19	3.7	NA
TMP25	04/05/10	13.49	1.6	0	6.2	-84	114	NA
TMP26	04/05/10	14.88	1.73	0	6.85	-158	144	NA
TMP27	04/05/10	14.69	0.23	0.98	6.68	47	115	NA
TMP28	04/07/10	17.08	0.463	0	5.25	184	53.4	NA
10A01	04/06/10	18.39	10.6	1.96	7.29	-210	795	NA



Table 5-1
April 2010 Field Parameters Summary (Continued)

Loc ID	Date	Temperature (°C)	Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Fe ²⁺ (mg/L)
10A02	04/06/10	15.55	3.13	0	7.05	-176	94.3	NA
10A03	04/06/10	16.96	4.17	0	7.02	-183	11.8	NA
10A04	04/06/10	15.55	5.66	0	6.9	-184	68.9	NA

BTOC = Below Top of Casing

°C = Degrees Celsius

mg/L = Milligrams per Liter

mS/cm = Millisiemens per Centimeter

mV = Millivolt

NA = Not analyzed at this location

NTU = Nephelometric Turbidity Unit

¹ Well located in BTEX Treatment Area

² Water quality meter malfunctioned; parameters could not be measured.



Reducing conditions (ORP less than -50 mV) are present in many monitoring wells within the active ERD treatment areas, including MW11, MW13, MW17, MW19, MW23, MW32, TMP25, TMP56, and the Barrier 10 IPs. Monitoring locations that did not have reducing conditions during the April 2010 sampling event but are located in areas where AECOM has injected sodium lactate include MW12, MW15, MW24, MW34, MW37, and TMP27.

Following the April 2010 LTM event, AECOM completed an injection event using EOS[®], an emulsified vegetable oil carbon substrate. This injection event provided a carbon source that should persist in the aquifer and promote anaerobic, reducing conditions following the end of AECOM's period of performance at ST-14. In several areas where TCE concentrations are elevated and/or DO concentrations and ORP do not indicate anaerobic, reducing conditions, AECOM injected a higher concentration of EOS[®]. Section 3.3 provides details of this injection event.

Neutral pH (pH 5–9) conditions are most favorable for ERD. The (March 2006) baseline pH measurements in most of the monitoring wells were just below the favorable range of pH, as is consistent with background conditions at Site ST-14 (between 4 and 5 pH). Typically, low pH can limit biological activity; however, increased pH (between 6 and 7) near the injection barriers suggests that the metabolism of sodium lactate has created a buffer capacity that is not native to the aquifer and that biodegradation can still occur without buffering the system. The April 2010 pH field measurements indicate that elevated pH levels (greater than 6) have been established in many of the wells located within or immediately downgradient of an injection barrier. Extremely basic conditions have consistently been observed in MW35 (April 2010, pH = 14+); however, this high pH is likely due to grout contamination in the monitoring well and is not representative of aquifer conditions in this area of the site.

BTEX Treatment Area: Aerobic conditions were observed in several of the wells in the northeast region of the site, including MW02, MW03, MW04, MW06, MW07, MW08, MW10, and MW31) near the site of the BTEX contamination and PermeOx[®] Plus injections. The supplemental PermeOx[®] Plus injection event, completed in May 2010, should continue to maintain elevated DO in this area and promote biodegradation of BTEX.

ORP is relatively high in the BTEX treatment area, except for MW04 and MW10 (MW04, ORP = -122 mV; MW10, ORP = -82 mV), where BTEX concentrations are highest. This shift to more reducing conditions in MW04 and MW10 is likely due to the elevated BTEX concentrations and the associated consumption of available oxygen. AECOM performed supplemental PermeOx[®] Plus injections in this area in May 2010, following the April 2010 LTM event, to address declining DO concentrations and increasing ORP.

5.3 Geochemical Indicators

Table 5-2 presents key geochemical indicators, including TOC, nitrate, sulfate, and methane analyzed during the April 2010 sampling event. Appendix D presents concentrations of the geochemical indicators discussed in this section from each sampling event conducted at Site ST-14, as well as select field parameters and concentrations of COCs.



**Table 5-2
April 2010 Geochemical Indicators Summary**

Loc ID	Date	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Methane (µg/L)
MW01 ¹	04/08/10	6.56	1.7	5 U	5 U
MW02 ¹	04/08/10	7.77	0.045 J	31.9	3.65 J
MW03 ¹	04/06/10	6.73	0.266	14.3	13.4
MW03-3471	04/08/10	15	0.221	18.1	9,830
MW04 ¹	04/06/10	8.08	0.081	37.9	36.2
MW05 ¹	04/08/10	8.78	0.284	30.4	1.58 J
MW06 ¹	04/05/10	6.01	0.561	18.3	5 U
MW07	04/09/10	4.31	0.814	3.13 J	5 U
MW08	04/05/10	8.84	0.187	43.4	1.25 J
MW09	04/08/10	2.07	3.51	9.56	10
MW10 ¹	04/05/10	35.3	0.105	5 U	3,420
MW11	04/09/10	191	0.416	5 U	4,750
MW12	04/08/10	6.7	1.69	12	6.97
MW13	04/09/10	25.9	0.13	5 U	5,290
MW15	04/06/10	23.5	0.041 J	5 U	10,600
MW16	04/07/10	14.6	0.05 U	19.8	2,180
MW17	04/09/10	27.2	0.269	5 U	4,450
MW19	04/08/10	1,650	0.582	5 U	19,500
MW22	04/07/10	18.6	0.359	4.53 J	9.61
MW23	04/07/10	368	0.05 U	5 U	16,800
MW24	04/06/10	2.76	0.05 U	5 U	112
MW27	04/07/10	1.09	1.07	5.18	7.95
MW29	04/12/10	8.81	0.335	19.9	5 U
MW30	04/05/10	6.22	3.1	5.71	5 U
MW31 ¹	04/09/10	2.23	0.987	27.3	5 U
MW32	04/07/10	12.4	0.05 U	5 U	14.7
MW33	04/07/10	5.81	2.06	12.3	5 U
MW34	04/05/10	1.3	2.11	28.2	1,560
MW35	04/06/10	2.49	0.565	5 U	154
MW37	04/07/10	12.1	0.05 U	15.9	360
SW)4	04/20/10	16.2	NA	NA	NA
SW05	04/20/10	2.74	NA	NA	NA
SW06	04/20/10	5.24	NA	NA	NA

mg/L = milligrams per liter
SW = Surface Water
TOC = Total Organic Carbon

µg/L = micrograms per liter
NA = Not analyzed at this location
¹ Well located in BTEX Treatment Area



Most monitoring wells at Site ST-14, especially those within or near injection barriers, have shown increased concentrations of TOC following sodium lactate injections. These changes indicate that the addition of sodium lactate effectively increased carbon loading in these areas. The increased carbon in the aquifer provides an additional carbon source for the proliferation of bacteria required for ERD. The residence time of carbon in the aquifer varies spatially throughout the site, depending on the geology and associated permeability of the subsurface. Thus, fluctuations in TOC concentrations may be expected between injection events. The supplemental EOS ® injection event in May and June 2010 will provide a slow-release carbon source, which should maintain elevated TOC concentrations over a longer period.

In the absence of oxygen in the groundwater treatment zone, anaerobic (denitrifying) bacteria will use nitrate as the primary electron acceptor. Decreased nitrate concentrations in many monitoring wells near the injection barriers suggest that nitrate is being depleted in the aquifer by microbial species using it as an electron acceptor.

Microbes can also use sulfate as a terminal electron acceptor for anaerobic biodegradation. Under anaerobic conditions, microbes typically reduce sulfate to sulfide, thus lower sulfate concentrations would be expected under anaerobic conditions. While some monitoring wells show depleted sulfate, concentrations in other monitoring wells have fluctuated and even increased since baseline sampling. During sampling, however, sulfide could be oxidized back to sulfate, explaining the higher sulfate concentrations.

Under anaerobic conditions, microbes use carbon dioxide as an electron acceptor and reduce it to methane, thus the detection of methane indicates the successful establishment of an anaerobic treatment zone. Increased methane concentrations have been observed in most of the ERD treatment areas (i.e., near injection barriers). These increases have been observed to a larger degree in the PDS Test Areas, which have received sodium lactate over a longer period.

5.4 Chemicals of Concern Groundwater Analysis Results

The primary COCs at Site ST-14 are TCE, CT, and BTEX. AECOM also monitors concentrations of DCE and VC, the by-products of TCE dechlorination. The areas with the highest concentrations of TCE include MW37 and TMP 28, located east of the parking lot of the Naval Air Facility, and MW32, located southeast of the Former East Side Gas Station. The highest concentration of TCE detected during the April 2010 sampling event was at TMP28 with a concentration of 491 µg/L. The highest concentrations of BTEX were detected in MW10 (north of the Former East Side Gas Station) with concentrations of benzene at 4,690 µg/L, toluene at 35,100 µg/L, ethylbenzene at 1,780 µg/L, and xylenes (total) at 13,160 µg/L. The highest concentration of CT was detected at MW24, near the Northern Fire Department Wash Site, at a concentration of 14.5 µg/L (Refer to Table 5-3).



Table 5-3
Principle Chemicals of Concern and Locations of Maximum Detections

Analyte	Number of Samples Above MDL	Range (µg/L)		Location of Maximum Detection	MCL (µg/L)
		Minimum Detected	Maximum Detected		
Trichloroethene	26 of 38	0.523 J	491	TMP28	5
Benzene	13 of 41	0.237 J	4,690	MW10	5
Toluene	5 of 41	0.8 J	35,100	MW10	1,000
Ethylbenzene	6 of 41	0.739 J	1,780	MW10	700
Total Xylene	5 of 41	0.554 J	13,160	MW10	10,000
Carbon Tetrachloride	5 of 41	0.273 J	14.5	MW24	5
Cis-1,2-Dichloroethylene	27 of 41	0.479 J	1,230	10A04	70
Trans-1,2-Dichloroethylene	5 of 41	0.262 J	0.827 J	10A02	100
Vinyl Chloride	12 of 41	0.512 J	7.9	10A02	2

MDL = Method Detection Limit

µg/L = Micrograms per Liter

MCL = Federal Drinking Water Maximum Contaminant Levels

¹ Well located in BTEX Treatment Area



AECOM collected four surface water samples (SW04, SW05, and SW06) during the April 2010 sampling event and analyzed for VOCs and TOC. These samples contained no detectable levels of COCs.

Table 5-3 lists the primary COCs and dechlorination by-products, the number of samples that contained concentrations above the MDL, the minimum and maximum detected concentrations, the monitoring well in which the maximum concentration was detected, and the federal MCL for each contaminant. Figures 5-1, 5-2, 5-3, and 5-4 illustrate the TCE, BTEX, benzene and CT plumes, respectively, at Site ST-14 based on the April 2010 sampling event.

For comparison to baseline plume conditions, Appendix F contains maps illustrating the contaminant isoconcentrations for TCE, BTEX, and CT based on the March 2006 baseline sampling event, and the six performance monitoring events in April, July, and October 2008, and January, April, July 2009, and the two LTM events in October 2009 and April 2010. The leading edges of the TCE, BTEX, and CT plume are defined by the 5 µg/L isoconcentration line. Comparison of the April 2010 TCE plume (Refer to Figure 5-1) to the March 2006 baseline TCE plume shows a decrease in the total area of the plume, as well as decreases in some of the areas with high concentrations in previous events. Notable decreases since the baseline sampling event included:

- MW17, located near Barrier 1, upgradient of the Former Aircraft Wash Rack (TCE non-detect at MW17);
- MW12, located near Barrier 5, near the Former Southern Fire Department Wash Site (64.1 µg/L of TCE at MW12);
- MW19, also located near Barrier 5 (TCE non-detect at MW19);
- MW11, located near Barrier 3, east of the 316th Civil Engineering Squadron (TCE non-detect at MW11);
- MW32, located northeast of Barrier 3 (229 µg/L of TCE at MW32); and,
- MW37, located at the southern end of the plume (354 µg/L of TCE at MW37).

These TCE reductions have followed a period of subsurface geochemical conditions trending toward favorable for ERD. MW34, located in the southern portion of Barrier 3, exhibited a notable increase in TCE concentration since the previous LTM event in October 2009 (101 µg/L of TCE at MW34). The increased concentration at MW34 indicates rebound since October 2009, when MW34 was non-detect for TCE. Injection of EOS® in this area during the supplemental injection event in May and June 2010 will help maintain anaerobic, reducing conditions in this area.

Comparison of the April 2010 BTEX plume (Refer to Figure 5-2) to the March 2006 baseline BTEX plume shows a slight decrease in the central area of the plume, near MW10 and MW04, where concentrations of BTEX (total) have historically been the highest. The April 2010 BTEX concentrations at these locations, however, are higher than in October 2009. In April 2010, the



total BTEX concentration was 6,840 µg/L at MW04 and 54,730 µg/L at MW10. BTEX concentrations have fluctuated significantly at MW10 over several sampling events, with the minimum concentration of 1,481.8 µg/L measured in January 2009. Due to fluctuating BTEX concentrations and the small number of wells in this area, the overall size of the plume has not decreased substantially since the March 2006 baseline sampling event. The southeastern portion of the plume is represented by dashed contour lines in Figures 5-2 (BTEX) and 5-3 (benzene) due to the lack of monitoring data in this area. Based on the hydraulic gradient in this area (to the northeast), it is not expected that BTEX contamination would spread in this direction. Because benzene is the primary contaminant of toxicological concern in the BTEX area, the benzene plume is illustrated in Figure 5-3.

Comparison of the April 2010 CT plume (Refer to Figure 5-4) to the March 2006 baseline and April 2008 CT plumes indicate reduction of the plume to two locations with elevated CT concentrations above the MCL of 5 µg/L. CT was detected at MW01 at a concentration of 11.6 µg/L and at MW24 at a concentration of 14.5 µg/L. These concentrations both represent increases since October 2009.

Section 5.5 discusses trend analysis and changes in concentrations of the above noted contaminants. Appendix A presents the VOC detections for all wells sampled in April 2010. Appendix B presents the data collected from the remaining laboratory analyses performed (Refer to Table 4-1). Appendix D presents concentrations of the COCs discussed in this section from each sampling event conducted at Site ST-14, as well as select field parameters and concentrations of select geochemical parameters.

5.5 Chemicals of Concern Trend Analysis

Trend analysis of the COCs at Site ST-14 is intended to demonstrate effectiveness of the remedy and achievement of the performance objectives in the *Contract Performance Work Statement for Sites ST14 and SS22 at Andrews AFB* (June 2005). These performance objectives are to: 1) prevent further migration of the plume, 2) eliminate/treat identified source areas, and 3) sufficiently treat and demonstrate degradation of contaminants in groundwater (including achievement of MCLs within 20 to 30 years). AECOM evaluated the data collected to date and during subsequent performance monitoring events with the goal of demonstrating achievement of these performance objectives within the stated period. The potential source areas at Site ST-14 were investigated in the *CEI* (IT, 2000) and the *Final Source Area Investigation Report* (Earth Tech, 2007b). No continuing sources of groundwater contamination were identified through either report. AECOM designed the implemented remedy to target the hot spots within the larger plume and reduce TCE concentrations in those areas through ERD. Through this targeted ERD approach, the contaminants in groundwater would be sufficiently remediated (i.e., returned to beneficial reuse) within the stated period. AECOM will demonstrate achievement of groundwater MCLs within 30 years through statistical trend analysis and extrapolation of the exponential trend. AECOM completed the initial analysis using six quarters of monitoring data (following the April 2009 sampling event), and updated the analysis to include data collected during the July and October 2009 and April 2010 sampling events.



**Table 5-4
April 2010 Chemicals of Concern Concentrations Summary**

Well ID	Date Sampled	Analyte Concentration (µg/L)									
		TCE	Benzene	Toluene	Ethyl benzene	m,p-Xylene	o-Xylene	CT	cis-1,2-DCE	trans-1,2-DCE	VC
MW01 ¹	04/08/10	29.6	0.4 U	1 U	1 U	2 U	1 U	11.6	5.04	1 U	1 U
MW02 ¹	04/08/10	5.77	15.4	2.59	20.4	20.4	4.31	1 U	0.479 J	1 U	1 U
MW03 ¹	04/06/10	45.5	20	0.8 J	0.739 J	2 U	1 U	0.273 J	2.96	1 U	1 U
MW03-3471	04/08/10	1 U	34.4	1 U	15.1	2 U	0.554 J	1 U	1 U	1 U	1 U
MW04 ¹	04/06/10	135	247	1,980	733	2,870	1,010	10 U	10 U	10 U	10 U
MW05 ¹	04/08/10	17.1	9.47	11.3	5.24	10.6	4.17	0.676 J	1.33	1 U	1 U
MW06 ¹	04/05/10	1.27	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
MW07	04/09/10	20.4	0.4 U	1 U	1 U	2 U	1 U	1 U	29.8	1 U	1 U
MW08	04/05/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
MW09	04/08/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
MW10 ¹	04/05/10	5 U	4,690	35,100	1,780	9,100	4,060	5 U	5 U	5 U	5 U
MW11	04/09/10	1 U	0.341 J	1 U	1 U	2 U	1 U	1 U	154	0.681 J	7.11
MW12	04/08/10	64.1	0.4 U	1 U	1 U	2 U	1 U	1 U	23.4	1 U	1 U
MW13	04/09/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	70.2	1 U	0.512 J
MW15	04/06/10	0.707 J	0.369 J	1 U	1 U	2 U	1 U	1 U	88.8	1 U	0.735 J
MW16	04/07/10	4.57	0.4 U	1 U	1 U	2 U	1 U	1 U	1.56	1 U	1 U
MW17	04/09/10	10 U	2.8 J	10 U	10 U	20 U	10 U	10 U	1,010	10 U	10 U
MW19	04/08/10	10 U	4 U	10 U	10 U	20 U	10 U	10 U	1,140	10 U	10 U
MW22	04/07/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
MW23	04/07/10	0.523 J	0.4 U	1 U	1 U	2 U	1 U	1 U	22	1 U	1 U
MW24	04/06/10	9.3	0.4 U	1 U	1 U	2 U	1 U	14.5	10.7	1 U	1 U
MW27	04/07/10	4.29	0.4 U	1 U	1 U	2 U	1 U	1.66	1.66	1 U	1 U
MW29	04/12/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
MW30	04/05/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U



Table 5-4
April 2010 Chemicals of Concern Concentrations Summary (Continued)

Well ID	Date Sampled	Analyte Concentration (µg/L)									
		TCE	Benzene	Toluene	Ethyl benzene	m,p-Xylene	o-Xylene	CT	cis-1,2-DCE	trans-1,2-DCE	VC
MW31 ¹	04/09/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
MW32	04/07/10	229	0.8 U	2 U	2 U	4 U	2 U	2 U	4.15	2 U	2 U
MW33	04/07/10	18.9	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
MW34	04/05/10	101	0.34 J	1 U	1 U	2 U	1 U	1 U	39.8	1 U	3.04
MW35	04/06/10	4.94	0.4 U	1 U	1 U	2 U	1 U	1 U	0.615 J	1 U	1 U
MW37	04/07/10	354	0.571 J	2 U	2 U	4 U	2 U	2 U	333	2 U	0.867 J
TMP25	04/05/10	94.2	2 U	5 U	5 U	10 U	5 U	5 U	767	5 U	3.29 J
TMP26	04/05/10	4.09 J	2 U	5 U	5 U	10 U	5 U	5 U	971	5 U	2.55 J
TMP27	04/05/10	4.04	0.4 U	1 U	1 U	2 U	1 U	1 U	0.708 J	1 U	1 U
TMP28	04/07/10	491	0.8 U	2 U	2 U	4 U	2 U	2 U	179	2 U	2.06
10A01	04/06/10	20	0.4 U	1 U	1 U	2 U	1 U	1 U	192	0.262 J	1.04
10A02	04/06/10	34.7	0.4 U	1 U	1 U	2 U	1 U	1 U	675	0.827 J	7.9
10A03	04/06/10	28.3	0.237 J	1 U	1 U	2 U	1 U	1 U	559	0.605 J	3.46
10A04	04/06/10	1.54	0.577	1 U	1 U	2 U	1 U	1 U	1,230	0.772 J	5.32
SW04	04/20/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
SW05	04/20/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U
SW06	04/20/10	1 U	0.4 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U

SW = Surface Water

J = Analyte reported between the mean MDL and the laboratory RL.

U = Analyte was not detected above the MDL.

¹ Well located in BTEX Treatment Area



Table 5-4 presents concentrations of the principle COCs (TCE, CT, and BTEX) and the dechlorination byproducts DCE and VC detected in the groundwater at Site ST-14 during the April 2010 sampling event. Appendix D presents concentrations of the COCs discussed in this section from each sampling event conducted at Site ST-14, as well as select field parameters and concentrations of select geochemical parameters.

AECOM completed a statistical analysis of the COC concentration data for Site ST-14 using Air Force Center for Engineering and the Environment's (AFCEE's) Monitoring and Remediation Optimization System (MAROS) software, which conducts both Mann-Kendall and linear regression analyses. Full utilization of the MAROS software requires at least four measured concentrations over a minimum of six sampling events. The April 2010 sampling event constitutes the ninth complete sampling event at Site ST-14. Additionally, the data set includes two partial monitoring events conducted in November 2007 and January 2008. The November 2007 monitoring event included 24 TMPs and 5 monitoring wells. The January 2008 monitoring event included 22 monitoring wells.

Using the data collected since the baseline sampling event in March 2006, AECOM completed the Mann-Kendall and linear regression analyses. AECOM extrapolated the exponential trends to predict achievement of MCLs within a reasonable time frame, as defined in the *Contract Performance Work Statement for Sites ST14 and SS22 at Andrews AFB* (June 2005).

5.5.1 Mann-Kendall Analysis

The Mann-Kendall analysis is a non-parametric statistical procedure that is well suited for analyzing trends in data over time (Gilbert, 1987). It does not require any assumptions about the distribution of the data (e.g., normal, lognormal, etc.) and can be used with data sets that include irregular sampling intervals and missing data (AFCEE, 2007). The 36 permanent monitoring wells at ST-14 were included in the Mann-Kendall analysis, discussed for each COC below.

TCE: Of the 36 monitoring wells included in Mann-Kendall analysis of TCE concentrations, 24 have concentrations of TCE below the MCL of 5 µg/L. Of the remaining 12 wells with concentrations of TCE above the MCL, four were classified as "Decreasing" (D), one was classified as "Probably Decreasing" (PD), and seven were classified as "No Trend" (NT). Table 5-5 includes the April 2010 TCE concentration, the Mann-Kendall statistic, and the corresponding concentration trend for each monitoring well with a TCE concentration above the MCL. A large negative Mann-Kendall statistic corresponds to stronger decreasing trends, while a large positive Mann-Kendall statistic corresponds to stronger increasing trends. The program assigns the appropriate classification (i.e., D, PD, or NT) based on the corresponding confidence in trend. The I (Increasing; no monitoring wells had this classification in April 2010) and D classifications correspond to high confidences in the trend (greater than 95%), while the intermediate classifications correspond to proportionately lower confidences in the trend. Appendix G presents the Mann-Kendall summary from the MAROS analysis of TCE, BTEX, and CT.



Table 5-5
Trichloroethene Mann-Kendall Analysis Summary

Well	April 2010 TCE Concentration (µg/L)	M-K Statistic	M-K Trend
MW12	64.1	-34	D
MW24	9.3	-37	D
MW33	18.9	-23	D
MW34	101	-24	D
MW03	45.5	-19	PD
MW01	29.6	4	NT
MW07	20.5	-3	NT
MW02	5.77	6	NT
MW04	135	9	NT
MW05	17.1	11	NT
MW32	229	14	NT
MW37	354	15	NT

µg/L = Micrograms per Liter

D = Decreasing

PD = Probably Decreasing

NT = No Trend



For the wells classified as Decreasing or No Trend, AECOM used linear regression of the concentration data to determine the exponential curve fit and estimate the length of time until the MCL will be achieved at those locations (when mathematically possible). Section 5.5.2 discusses this analysis. Since the October 2009 LTM event, TCE concentrations at MW32 and MW37 have decreased, causing a shift in the concentration trends at these locations, which had previously been classified as increasing (I). While statistically decreasing trends have not yet been established at these locations (both classified as NT in April 2010), the observed response to supplemental substrate injections suggests that continued reductions in TCE concentrations may be expected.

BTEX: Of the 36 monitoring wells included in Mann-Kendall analysis of BTEX concentrations, 30 have concentrations of benzene below the MCL of 5 µg/L. Of the remaining six wells with concentrations of benzene above the MCL, two were classified as “Decreasing” (D), two were classified as “Stable” (S), and two were classified as “No Trend” (NT). Table 5-6 includes the April 2010 benzene concentration, the Mann-Kendall statistic, and the corresponding concentration trend for each monitoring well with a benzene concentration above the MCL. Of the 36 monitoring wells included in Mann-Kendall analysis of BTEX concentrations, 34 have concentrations of ethylbenzene below the MCL of 700 µg/L. The remaining wells (MW04 and MW10) were classified as “Stable” (S) and “No Trend” (NT), respectively. Table 5-7 includes the April 2010 ethylbenzene concentration, the Mann-Kendall statistic, and the corresponding concentration trend for the two monitoring wells with ethylbenzene concentrations above the MCL. Of the 36 monitoring wells included in Mann-Kendall analysis of BTEX concentrations, 34 have concentrations of toluene below the MCL of 1,000 µg/L. The remaining wells (MW04 and MW10) were classified as “Decreasing” (D) and “No Trend” (NT), respectively. Table 5-8 includes the April 2010 toluene concentration, the Mann-Kendall statistic, and the corresponding concentration trend for the two monitoring wells with toluene concentrations above the MCL. Of the 36 monitoring wells included in Mann-Kendall analysis of BTEX concentrations, 35 have concentrations of total xylenes below the MCL of 10,000 µg/L. The remaining well (MW10) was classified as “Stable” (S). Table 5-9 includes the April 2010 total xylenes concentration, the Mann-Kendall statistic, and the corresponding concentration trend for MW10. Appendix G presents the Mann-Kendall summary from the MAROS analysis of TCE, BTEX, and CT.

For the wells classified as Decreasing or Stable, AECOM used linear regression of the concentration data to determine the exponential curve fit and estimate the length of time until MCLs will be achieved at those locations (when mathematically possible). Section 5.5.2 discusses this analysis. Because the fluctuating BTEX concentrations at MW04 and MW10, the exponential curve fit, in many cases, is not a very good representation of the data, as discussed in Section 5.5.2.

CT: Of the 36 monitoring wells included in Mann-Kendall analysis of CT concentrations, 34 have concentrations of CT below the MCL of 5 µg/L. The remaining wells (MW01 and MW24) were classified as “No Trend” (NT) and “Stable” (S), respectively. Table 5-10 includes the April 2010 CT concentration, the Mann-Kendall statistic, and the corresponding concentration trend for the two monitoring wells with CT concentrations above the MCL. Appendix G presents the Mann-Kendall summary from the MAROS analysis of TCE, BTEX, and CT.



Table 5-6
Benzene Mann-Kendall Analysis Summary

Well	April 2010 Benzene Concentration (µg/L)	Mann-Kendall Statistic	Mann-Kendall Trend
MW03	20	-43	D
MW04	247	-37	D
MW05	9.47	-13	S
MW10	4,690	-4	S
MW03-3471	34.4	6	NT
MW02	15.4	4	NT

µg/L = Micrograms per Liter

D = Decreasing

S = Stable

NT = No Trend

Table 5-7
Ethylbenzene Mann-Kendall Analysis Summary

Well	April 2010 Ethylbenzene Concentration (µg/L)	Mann-Kendall Statistic	Mann-Kendall Trend
MW04	733	-10	S
MW10	1,780	-2	NT

µg/L = Micrograms per Liter

S = Stable

NT = No Trend

Table 5-8
Toluene Mann-Kendall Analysis Summary

Well	April 2010 Toluene Concentration (µg/L)	Mann-Kendall Statistic	Mann-Kendall Trend
MW04	1,980	-21	D
MW10	35,100	-2	S

µg/L = Micrograms per Liter

D = Decreasing

S = Stable



Table 5-9
Total Xylenes Mann-Kendall Analysis Summary

Well	April 2010 Total Xylenes Concentration (µg/L)	Mann-Kendall Statistic	Mann-Kendall Trend
MW10	13,160	-4	S

µg/L = Micrograms per Liter

S = Stable

Table 5-10
Carbon Tetrachloride Mann-Kendall Analysis Summary

Well	April 2010 CT Concentration (µg/L)	Mann-Kendall Statistic	Mann-Kendall Trend
MW24	14.5	-6	S
MW01	11.6	11	NT

µg/L = Micrograms per Liter

S = Stable

NT = No Trend



For the well classified as Stable (MW24), linear regression of the concentration data was used to determine the exponential curve fit and estimate the length of time until the MCL will be achieved at that locations. This calculation could not be completed for MW01 because there is not a statistically decreasing trend in the concentration data. Section 5.5.2 discusses this analysis.

5.5.2 Linear Regression Extrapolation

For the monitoring wells classified as Decreasing or Stable, and select wells classified as No Trend (where a decreasing linear regression could be obtained) through the Mann-Kendall analysis, linear regression was performed on the concentration data. Using the exponential curve generated through linear regression, the number of years until the MCL for each contaminant would be achieved at that monitoring well was predicted. The primary performance objective of the task order is to achieve MCLs within 30 years. Linear regression analysis of the concentration trends at monitoring wells classified as Increasing, Probably Increasing, or No Trend generally do not show a negative logarithmic slope, and thus do not indicate achievement of MCLs. As such, this discussion does not include these monitoring wells, noted in each subsection below. Section 3.0 discusses the additional remedial actions that AECOM has performed to date to address the increasing trends.

Table 5-11 presents a summary of the linear regression analysis for TCE, benzene, ethylbenzene, toluene, total xylenes, and CT. The coefficient of determination (R^2) (third column of Table 5-11, provides a measure of how well future outcomes are likely to be predicted by the regression analysis. Appendix H presents the trend graphs for each well discussed in this section.

TCE: Table 5-11 lists the four wells classified as D (MW12, MW24, MW33, and MW34), one well classified as PD (MW03), and two of the wells classified as NT (MW01 and MW07) for TCE concentrations. The number of years (measured from the baseline sampling event in March 2006) predicted until the MCL of 5 $\mu\text{g/L}$ is achieved at these locations ranged from 5.24 years at MW34 to 60.96 years at MW07. These estimates are based on the linear regression curves included in Appendix H. The level of confidence in the predictions listed in Table 5-11 directly correlate to the R^2 value for each well; therefore, low R^2 value is associated with a less reliable prediction. The linear regression did not generate a negative exponential slope for the TCE concentration data from MW02, MW04, MW05, MW32, and MW37; therefore, the trendlines were not decreasing and these wells were not included in Table 5-11.

BTEX: Table 5-11 lists the two wells classified as Decreasing and the two wells classified as Stable for benzene concentrations. The number of years (measured from the baseline sampling event in March 2006) predicted until the MCL of 5 $\mu\text{g/L}$ is achieved at these locations ranged from 8.08 years at MW03 to 19.81 years at MW04. These estimates are based on the linear regression curves included in Appendix H. The linear regression did not generate a negative exponential slope for the benzene concentration data from MW02 and MW03-3471; therefore, the trendlines were not decreasing and these wells were not included in Table 5-11.



**Table 5-11
Linear Regression Extrapolation Summary**

Well	Mann-Kendall Trend	Coefficient of Determination (R ²)	Years to MCL ¹
TRICHLOROETHYLENE (MCL = 5 µg/L)			
MW12	D	0.7049	8.74
MW24	D	0.8407	6.86
MW33	D	0.6048	13.09
MW34	D	0.1853	5.24
MW03	PD	0.2631	41.4
MW01	NT	0.4256	11.78
MW07	NT	0.0025	60.96
BENZENE (MCL = 5 µg/L)			
MW03	D	0.9087	8.08
MW04	D	0.6425	19.81
MW05	S	0.2958	10.31
MW10	S	0.0871	18.3
ETHYLBENZENE (MCL = 700 µg/L)			
MW10	NT	0.0622	0.38 ²
TOLUENE (MCL = 1,000 µg/L)			
MW04	D	0.4617	6.71
MW10	S	0.0730	8.35
CARBON TETRACHLORIDE (MCL = 5 µg/L)			
MW24	S	0.0086	7.53

MCL = Maximum Contaminant Level

µg/L = Micrograms per Liter

D = Decreasing Trend

PD = Probably Decreasing

S = Stable Trend

NT = No Trend

¹ Measured in years from baseline sampling event (March 2006)



Table 5-11 lists MW10 and the associated linear regression extrapolation for ethylbenzene concentrations. MW10, classified as NT, is predicted to achieve the MCL of 700 µg/L in 0.38 years (measured from the baseline sampling event in March 2006). This prediction, however, is not a reasonable indicator of the trend ($R^2 = 0.0622$), because the exponential fit places the trend line (Appendix H) below the current concentration. The linear regression curve for the ethylbenzene trend at MW04 is also included in Appendix H; however, no calculations could be completed because the trend line is below the MCL of 700 µg/L.

Table 5-11 lists MW04 and MW10 and the associated linear regression extrapolations for toluene concentrations. MW04, classified as D, is predicted to achieve the MCL of 1,000 µg/L in 6.71 years (measured from the baseline sampling event in March 2006). MW10, classified as S, is predicted to achieve the MCL in 8.35 years. These estimates are based on the linear regression curves included in Appendix H.

As with the ethylbenzene concentration trend at MW04, no calculations could be completed for the total xylenes concentration trend at MW10 because the trend line is below the MCL of 10,000 µg/L. The linear regression curve is included in Appendix H.

CT: Table 5-11 lists MW24 and the associated linear regression extrapolations for CT concentrations. MW24, classified as S, is predicted to achieve the MCL of 5 µg/L in 7.53 years (measured from the baseline sampling event in March 2006). This estimate is based on the linear regression curve included in Appendix H; however, it is not a reliable prediction because of the low R^2 value (0.0086). The linear regression did not generate a negative exponential slope for the CT concentration data from MW01; therefore, the trendline was not decreasing and this well was not included in Table 5-11.

5.6 Phospholipid Fatty Acid Analysis

PLFAs are essential components of living cells and therefore can be used as a proxy for the living and active microbial biomass. PLFA profiles contain detailed information on lipid structure that can be used to investigate microbial community structure and metabolic conditions. This analysis provides a broad base description of the entire microbial community with information obtained about viable biomass concentrations and community composition. PLFA analysis is a method of measuring and characterizing microbial populations. At Site ST-14, AECOM collected and analyzed samples for PLFA during the following sampling events:

- PDS – March 2006 (IP3A)
- PDS – August 2006 (IP1A, MP2A, IP3A, MP3B, MW11, and MW13);
- November 2007 (IP1A, IP3A, MW11, MW12, MW13, MW15, MW19, MW23, MW24, and MW34);
- April 2008 (MW11, MW12, MW15, MW16, MW17, MW19, MW23, MW24, MW32, MW33, MW34, and MW37);



- October 2008 (MW11, MW12, MW15, MW16, MW17, MW19, MW23, MW24, MW32, MW33, MW34, and MW37); and
- April 2009 (MW11, MW12, MW15, MW16, MW17, MW19, MW23, MW24, MW32, MW33, and MW34).

Appendix C includes the results of the PLFA analyses from the sampling events listed above. Terminally branched PLFA are common in *Firmicutes*, the bacteria responsible for reductive dechlorination. An increase in terminally branched PLFA is commonly observed as environmental conditions shift from aerobic to anaerobic conditions (i.e., the intended shift at Site ST-14). PLFA analysis reports *Firmicutes* as a proportion of the total biomass. The data collected to date suggest that the appropriate conditions were established at ST-14 to promote ERD in the full-scale treatment areas.



6.0 Conclusions

The April 2010 sampling event represents the second semiannual LTM event at Site ST-14 at Andrews AFB. The concentrations of the primary COCs (i.e., TCE, CT, and BTEX) detected in the groundwater samples were compared to results from the baseline groundwater sampling event in March 2006, the six quarterly performance monitoring events conducted from April 2008 through July 2009, and the first LTM event conducted in October 2009. The groundwater analytical data and geochemical field parameters at Site ST-14 suggest that the remedial actions performed at the site, including PermeOx[®] Plus and sodium lactate injections, generated favorable conditions in the treatment areas conducive to the biodegradation of the primary COCs.

AECOM completed the Mann-Kendall statistical analysis to demonstrate decreasing concentrations in the permanent monitoring wells at ST-14. This analysis identified decreasing trends in many areas of the site and stable concentrations or no trends in a few areas. The primary areas of concern include the southern portion of the site near MW37; the northeast portion of the site, near MW32; and the BTEX treatment area. COC concentrations in MW32 and MW37 have begun to decline because of the supplemental sodium lactate injections in these areas; however, statistically declining trends have not yet been established. AECOM also performed a linear regression analysis for wells with declining concentrations to predict when MCLs will be achieved based on the observed trends to date at each monitoring well. This analysis demonstrated that most of the monitoring wells with decreasing trends would achieve MCLs within 20 to 30 years (or less in some wells).

In July 2009, AECOM installed additional substrate injection points in the three identified trouble areas (near MW07, MW32, and MW37) and began a series of three sodium lactate injection events to address increasing TCE concentrations. AECOM also performed a supplemental round of PermeOx[®] Plus injections in July 2009 in the BTEX treatment area in order to maintain aerobic conditions. These supplemental remedial actions were largely successful in establishing the required subsurface conditions for biodegradation of COCs.

In May and June 2010, AECOM performed an injection of EOS[®], a relatively slow release carbon substrate, utilizing many of the existing sodium lactate injection barriers. This injection event will provide a longer lasting source of carbon to the subsurface in order to maintain reducing conditions following the end of AECOM's period of performance at ST-14. Concentrations of COCs, TOC, DO, and ORP should be monitored to evaluate the need for future substrate injections.

The data collected during the second LTM event showed that the remedial actions implemented at ST-14 have had positive results in most of the targeted areas. Surface water sampling conducted during this event showed that dissolved contaminants in groundwater at ST-14 have not migrated to downgradient surface water drainages.



7.0 References

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APPENDIX A
GROUNDWATER SAMPLING DATA SUMMARY
(VOLATILE ORGANIC COMPOUNDS)

Appendix A
April 2010 Groundwater and Surface Water Sampling Data Summary - Volatile Organic Compounds

Well ID	Analyte Concentration (µg/L)																																					
	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,2-Dichloropropane	1,3,5-Trimethylbenzene	1,4-Dichlorobenzene	Acetone	Benzene	Carbon Tetrachloride	Chloroethane	Chloroform	Chloromethane	cis-1,2-Dichloroethylene	Ethylbenzene	Isopropylbenzene	m,p-Xylene	Methyl Ethyl Ketone	Methylene Chloride	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Cymene	sec-Butylbenzene	Styrene	t-Butylbenzene	tert-Butyl Methyl Ether	Tetrachloroethylene	Toluene	trans-1,2-Dichloroethene	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride		
MW01	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	11.6	1 U	2.15	1 U	5.04	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.2 J	0.624 J	1 U	1 U	29.6	1.69	1 U		
MW02	1 U	1 U	1 U	7.44	1 U	0.5 U	1 U	0.569 J	0.5 U	10 R	15.4	1 U	1 U	0.265 J	1 U	0.479 J	20.4	1.7	20.4	10 U	0.887 J	10.7	0.483 J	3.14	4.31	1 U	1 U	0.352 J	1 U	5 U	1 U	2.59	1 U	5.77	1 U	1 U		
MW03	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	20	0.273 J	1 U	1.32	1 U	2.96	0.739 J	8.57	2 U	10 U	3.26	18	3.2	8.73	1 U	1 U	1.19	1 U	1 U	5 U	0.538 J	0.8 J	1 U	45.5	1 U	1 U		
MW03-3471	1 U	1 U	1 U	2.66	0.64 J	0.5 U	1 U	1 U	0.5 U	10 R	34.4	1 U	1 U	0.3 U	1 U	1 U	15.1	5.92	2 U	10 U	1 U	38	1.9	6.99	0.554 J	3.02	3.49	1 U	0.507 J	13.1	1 U	1 U	1 U	1 U	1 U	1 U		
MW04	10 U	10 U	10 U	705	10 U	5 U	10 U	160	5 U	100 R	247	10 U	10 U	3 U	10 U	10 U	733	27.7	2870	100 U	11.6	280	21.3	84.5	1010	2.64 J	3.01 J	10 U	10 U	50 U	10 U	1980	10 U	135	10 U	10 U		
MW05	1 U	1 U	1 U	4.14	1 U	0.5 U	1 U	0.805 J	0.5 U	10 R	9.47	0.676 J	1 U	0.136 J	1 U	1.33	5.24	0.274 J	10.6	10 U	1 U	1.1	1 U	0.743 J	4.17	1 U	1 U	1 U	1 U	5 U	0.305 J	11.3	1 U	17.1	1 U	1 U		
MW06	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1.27	1.5	1 U		
MW07	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	29.8	1 U	1 U	2 U	10 U	0.289 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1.42	1 U	1 U	20.4	1 U	1 U			
MW08	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
MW09	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
MW10	5 U	5 U	5 U	1680	5 U	2.5 U	1.04 J	419	2.5 U	50 R	4690	5 U	5 U	1.5 U	5 U	5 U	1780	42.5	9100	50 U	5 U	676	29.7	102	4060	4.1 J	3.55 J	5 U	5 U	25 U	5 U	35100	5 U	5 U	5 U	5 U	5 U	
MW11	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10.9 J	0.341 J	1 U	1 U	0.3 U	1 U	154	1 U	1 U	2 U	10 U	0.45 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	0.681 J	1 U	1 U	7.11	1 U	1 U	
MW12	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.465	1 U	23.4	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.71 J	1 U	1 U	1 U	64.1	1 U	1 U	1 U		
MW13	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	70.2	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	0.512 J	1 U	1 U	
MW15	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.369 J	1 U	1 U	0.3 U	1 U	88.8	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	0.707 J	1 U	0.735 J	1 U	0.735 J	
MW16	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	1.56	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	4.57	1 U	1 U	1 U		
MW17	10 U	10 U	10 U	10 U	10 U	5 U	10 U	10 U	5 U	100 R	2.8 J	10 U	10 U	3 U	10 U	1010	10 U	10 U	20 U	100 U	5.49 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
MW19	10 U	10 U	10 U	10 U	10 U	5 U	10 U	10 U	5 U	100 R	4 U	10 U	10 U	3 U	10 U	1140	10 U	10 U	20 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	
MW22	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
MW23	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	138 R	0.4 U	1 U	1 U	0.3 U	1 U	22	1 U	1 U	2 U	46.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	0.523 J	1 U	1 U	1 U	1 U	
MW24	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	5.02 J	0.4 U	14.5	1 U	2.13	1 U	10.7	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.652 J	1 U	1 U	1 U	9.3	1 U	1 U	1 U	1 U	
MW27	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1.66	1 U	0.63	1 U	1.66	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	4.29	1.39	1 U	1 U	1 U		
MW29	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		
MW30	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.238 J	1 U	1 U	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.03 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
MW31	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	2 U	10 U	0.353 J	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
MW32	2 U	2 U	2 U	2 U	2 U	1 U	2 U	2 U	1 U	20 R	0.8 U	2 U	2 U	1.53	2 U	4.15	2 U	2 U	4 U	20 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	8.06	2 U	2 U	229	2 U	2 U	2 U	
MW33	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	0.463 J	1 U	1 U	1 U	18.9	0.89 J	1 U	1 U	1 U	
MW34	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.34 J	1 U	1 U	0.3 U	1 U	39.8	1 U	1 U	2 U	10 U	0.269 J	1 U	1 U	1 U	1 U	1 U	1 U	0.552 J	1 U	1 U	1 U	101	1 U	1 U	101	1 U	3.04	
MW35	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 R	0.4 U	1 U	1 U	0.3 U	1 U	0.615 J	1 U	1 U	2 U	10 U	0.365 J	1 U	1 U	1 U	1 U	1 U	1 U	0.479 J	5 U	1 U	1 U	1 U	4.94	1 U	1 U	1 U	1 U	
MW37	2 U	6.68	6.08	2 U	2 U	1 U	2 U	2 U	1 U	20 R	0.571 J	2 U	2 U	0.6 U	2 U	333	2 U	2 U	4 U	20 U	1.9 B	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U	2 U	354	1.37 J	0.867 J	1 U	0.867 J	
TMP25	5 U	3.16 J	7	5 U	5 U	2.5 U	5 U	5 U	2.5 U	50 U	2 U	5 U	5 U	1.5 U	5 U	767	5 U	5 U	10 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	94.2	5.01	3.29 J
TMP26	5 U	5 U	14	5 U	5 U	2.5 U	5 U	5 U	2.5 U	50 U	2 U	5 U	5 U	1.5 U	5 U	971	5 U	5 U	10 U	17.3 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	4.09 J	5 U	2.55 J
TMP27	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 U	0.4 U	1 U	1 U	0.3 U	1 U	0.708 J	1 U	1 U	2 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	4.04	1 U	1 U	1 U	1 U	1 U	
TMP28	0.536 J	5.63	7.09	2 U	2 U	1 U	2 U	2 U	0.251 J	20 U	0.8 U	2 U	2 U	0.6 U	2 U	179	2 U	2 U	4 U	20 U	1.63 J	2 U	2 U	2 U	2 U	2 U	2 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2.06
10A01	1 U	1 U	1.6	1 U	1 U	0.5 U	1 U	1 U	0.5 U	78.3	0.4 U	1 U	0.712 J	0.3 U	1 U	192	1 U	1 U	2 U	147	1.64	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	0.262 J	20	1 U	1 U	1 U	1.04		
10A02	1 U	1.72	9.49	1 U	1 U	0.372 J	1 U	1 U	0.5 U	10.8	0.4 U	1 U	5.71	0.3 U	1 U	675	1 U	1 U	2 U	25.5	1 U	0.603 J	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	0.827 J	34.7	1 U	1 U	7.9	7.9		
10A03	1 U	2.9	8.94	1 U	1 U	0.5 U	1 U	1 U	0.5 U	3.96 J	0.237 J	1 U	1.54	0.3 U	0.59 J	559	1 U	1 U	2 U	18.3	0.491 J	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	0.605 J	28.3	0.531 J	3.46	3.46	3.46		
10A04	1 U	2.83	17.5	1 U	1 U	0.5 U	1 U	1 U	0.5 U	14.1	0.577	1 U	4.74	0.395	0.702 J	1230	1 U	1 U	2 U	29.4	1.32	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	0.772 J	1.54	1 U	1 U	5.32	5.32		
SW04	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 U	0.4 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	2 U	10 U	0.254 J	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
SW05	1 U	1 U	1 U	1 U	1 U	0.5 U	1 U	1 U	0.5 U	10 U	0.4 U	1 U	1 U	0.3 U	1 U	1 U	1 U	1 U	2 U	10 U	0.377 J	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	
SW06	1 U	1 U	1 U	1 U	1 U</																																	

APPENDIX B
GROUNDWATER SAMPLING DATA SUMMARY
(OTHER)

Appendix B
April 2010 Groundwater Sampling Data Summary - Other

Well ID	Total Organic Carbon (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Arsenic (mg/L)	Iron (mg/L)	Manganese (mg/L)	Nitrogen (mg/L)	Sulfate, as SO4 (mg/L)	Total Alkalinity, as CaCO3 (mg/L)
MW01	6.56	5 U	5 U	5 U	0.0404	5.27	0.042	1.7	5 U	7.8 J
MW02	7.77	5 U	5 U	3.65 J	0.0554	13.9	0.0368	0.045 J	31.9	8.51 J
MW03	6.73	5 U	5 U	13.4	0.01 U	1.21	0.0652	0.266	14.3	10.9
MW03-3471	15	5 U	5 U	9,830	0.01 U	30.1	0.0472	0.221	18.1	110
MW04	8.08	5 U	5 U	36.2	0.0098 J	80	0.124	0.081	37.9	65.4
MW05	8.78	5 U	5 U	1.58 J	0.0368	1.04	0.0171	0.284	30.4	65.8
MW06	6.01	5 U	5 U	5 U	0.01 U	1.43	0.0076 J	0.561	18.3	71.8
MW07	4.31	5 U	5 U	5 U	0.0067 J	3.77	0.0265	0.814	3.13 J	44.8
MW08	8.84	5 U	5 U	1.25 J	0.01 U	0.618	0.01 U	0.187	43.4	225
MW09	2.07	5 U	5 U	10	0.0412	0.269	0.0069 J	3.51	9.56	20.8
MW10	35.3	5.78	5 U	3,420	0.0058 J	28.7	0.477	0.105	5 U	228
MW11	191	5 U	5 U	4,750	0.0973	113	0.102	0.416	5 U	938
MW12	6.7	5 U	5 U	6.97	0.0053 J	0.164	0.0183	1.69	12	65.6
MW13	25.9	100 U	100 U	5,290	0.108	80.4	0.0824	0.13	5 U	663
MW15	23.5	5 U	5 U	10,600	0.01 U	5.31	0.0211	0.041 J	5 U	1000
MW16	14.6	5 U	5 U	2,180	0.01 U	124	4	0.05 U	19.8	68.4
MW17	27.2	5 U	5 U	4,450	0.0147	65.4	0.0541	0.269	5 U	278
MW19	1650	5 U	5 U	19,500	0.01 U	145	0.121	0.582	5 U	2210
MW22	18.6	5 U	5 U	9.61	0.01 U	5.4	0.197	0.359	4.53 J	63.8
MW23	368	5 U	5 U	16,800	0.01 U	35.9	0.36	0.05 U	5 U	1580
MW24	2.76	5 U	5 U	112	0.01 U	7.22	0.0512	0.05 U	5 U	21.6
MW27	1.09	5 U	5 U	7.95	0.01 U	0.439	0.0645	1.07	5.18	7.59 J
MW29	8.81	5 U	5 U	5 U	0.01 U	0.917	0.0206	0.335	19.9	25
MW30	6.22	5 U	5 U	5 U	0.01 U	0.0842 J	0.0308	3.1	5.71	15.6
MW31	2.23	5 U	5 U	5 U	0.0078 J	0.0273 J	0.0429	0.987	27.3	11.6
MW32	12.4	5 U	5 U	14.7	0.01 U	33.4	0.184	0.05 U	5 U	81.8
MW33	5.81	5 U	5 U	5 U	0.01 U	0.055 J	0.0656	2.06	12.3	9.75 J
MW34	1.3	5 U	5 U	1,560	0.01 U	7.2	0.265	2.11	28.2	36.7
MW35	2.49	5 U	5 U	154	0.01 U	0.0587 J	0.01 U	0.565	5 U	184
MW37	12.1	5 U	5 U	360	0.01 U	27.8	3.77	0.05 U	15.9	70.3

U = Non-detect

J = Estimated quantity

APPENDIX C
PLFA ANALYSIS SUMMARY

**Appendix C: PLFA Analysis Summary
Andrews Air Force Base, Camp Springs, MD**

Well ID	Sample Date	Total Biomass (cells/mL)	Firmicutes (% of PLFA)	Proteobacteria (% of PLFA)	Anaerobic Metal Reduction (% of PLFA)	SRB/Actino- mycetes (% of PLFA)	General (% of PLFA)	Eukaryotes (% of PLFA)	Slowed Growth (ratio cy/cis)	Decreased Permeability (ratio trans/cis)
IP1A	8/31/2006	1.70E+05	30.82	41.23	0.26	0.2	27.1	0.39	NA	NA
IP1A	10/24/2007	4.55E+06	11.6	34.76	3.54	0.71	42.93	6.42	0.34	0.23
IP3A	2/26/2006	4.34E+03	0	46.99	0	0	47.55	5.47	NA	NA
IP3A	8/31/2006	9.64E+03	41.46	38.75	0.46	0.34	18.81	0.2	NA	NA
IP3A	10/24/2007	5.96E+06	16.99	35.41	1.39	0.54	37.72	7.95	0.40	0.10
MP2A	9/6/2006	1.48E+05	14	58	1	1	26	1	NA	NA
MP3B	8/31/2006	1.73E+05	19.02	54.96	0.44	0.26	24.98	0.35	NA	NA
MW11	8/30/2006	2.12E+04	9	63	0	1	26	1	NA	NA
MW11	10/23/2007	4.79E+07	4	7.07	0.06	0	23.39	0	0.60	0.73
MW11	3/27/2008	7.58E+06	9.82	42.46	0.22	0.19	40.74	6.58	1.73	0.67
MW11	10/6/2008	1.82E+07	23.38	35.83	2.58	0	31.16	7.05	0.67	0.72
MW11	4/7/2009	3.99E+07	33.25	31.87	2.45	1.19	26.78	4.44	0.49	0.43
MW12	10/23/2007	7.68E+04	12.58	62.43	5.64	1.78	17.1	0.48	0.71	0.11
MW12	3/26/2008	2.66E+05	4.56	61.44	3.02	2.34	19.42	9.25	0.19	0.27
MW12	10/3/2008	7.93E+05	7.62	70.47	1.78	3.18	13.93	3	0.24	0.21
MW12	4/14/2009	4.29E+05	5.46	73.78	1.46	1.82	14.36	3.08	0.43	0.06
MW13	8/30/2006	1.25E+06	22.53	48.45	0.51	0.55	27.69	0.27	NA	NA
MW13	10/23/2007	1.23E+07	14.96	40.72	0.74	12.97	26.32	4.3	0.19	0.08
MW15	10/23/2007	8.05E+05	17.73	52.13	1.15	2.54	25.66	0.78	3.02	1.03
MW15-DUP	10/23/2007	8.48E+05	20.01	51.67	1.06	1.16	25.58	0.54	2.69	0.99
MW15	3/25/2008	1.70E+06	25.59	47.52	1.06	1.15	24.47	0.21	0.15	0.59
MW15	10/3/2008	2.62E+06	21.28	44.54	2.35	1.14	30.53	0.15	0.37	0.98
MW15	4/9/2009	1.11E+06	12.73	63.4	1.76	1.55	20.31	0.26	0.54	0.2
MW16	3/27/2008	4.02E+05	0.54	82.71	2.32	3.35	8.83	2.27	0.30	0.59
MW16-DUP	3/27/2008	3.16E+05	0.47	79.53	3.31	4.20	9.16	3.32	0.32	0.64
MW16	10/3/2008	1.01E+04	2.03	44.43	0	9.04	44.51	0	1.34	0.00
MW16	4/7/2009	1.91E+05	0.63	79.21	0	2.31	14.71	3.15	0.26	0.24
MW17	3/31/2008	4.15E+05	9.37	62.42	2.02	2.31	23.73	0.17	0.22	0.09
MW17	9/30/2008	1.50E+05	3.95	58.13	1.61	6.78	29.52	0	0.23	0.13
MW17	4/14/2009	1.56E+05	7.96	63.28	1.8	3.87	22.74	0.35	0.24	0.11
MW19	10/23/2007	3.38E+05	7.68	66.19	2.7	2.17	18.89	2.34	0.40	0.03
MW19	3/26/2008	2.03E+06	17.74	60.91	1.11	0.77	17.85	1.61	0.32	0.81
MW19	10/3/2008	2.18E+06	9.45	64.07	2.2	0.36	23.17	0.75	0.28	0.44
MW19	4/14/2009	7.02E+05	6.8	72.76	2.88	0.63	16.42	0.51	0.26	0.09
MW23	10/23/2007	3.10E+05	2.19	68.11	0.53	2.17	25.16	1.85	0.29	0.02
MW23	3/26/2008	6.94E+06	15.60	66.39	0.31	0.24	17.45	0.00	0.51	3.58
MW23	10/6/2008	5.63E+05	11.45	66.5	1.26	1.01	19.66	0.12	0.69	1.16
MW23	4/9/2009	4.78E+05	15.35	57.76	1.93	1.62	22.7	0.65	0.73	0.11

NA = Not Available

**Appendix C: PLFA Analysis Summary
Andrews Air Force Base, Camp Springs, MD**

Well ID	Sample Date	Total Biomass (cells/mL)	Firmicutes (% of PLFA)	Proteobacteria (% of PLFA)	Anaerobic Metal Reduction (% of PLFA)	SRB/Actino- mycetes (% of PLFA)	General (% of PLFA)	Eukaryotes (% of PLFA)	Slowed Growth (ratio cy/cis)	Decreased Permeability (ratio trans/cis)
MW24	10/23/2007	1.37E+04	4.63	44.23	0	2.66	35.49	12.98	1.91	0.00
MW24	3/26/2008	7.61E+05	5.23	71.29	0.50	0.46	22.06	0.43	0.13	0.06
MW24	10/6/2008	1.17E+05	7.62	59.64	1.26	3.3	23.25	4.92	0.54	0.07
MW24	4/9/2009	3.36E+05	3.85	73.41	0.88	2.37	17.96	1.53	0.18	0.08
MW32	3/26/2008	3.46E+04	9.44	48.27	2.16	8.03	22.25	9.84	0.76	0.14
MW32	10/6/2008	2.53E+04	0.6	62.37	1.45	0	32.47	3.1	0.62	0.61
MW32	4/7/2009	3.96E+04	5.48	61.9	1.88	3.87	24.05	2.81	1.65	0.1
MW33	3/25/2008	8.68E+04	10.70	56.32	1.15	2.28	14.34	15.20	5.11	0.25
MW33	10/6/2008	2.86E+04	5.18	52.98	1.71	2.75	35.73	1.67	4.92	0.00
MW33	4/9/2009	2.03E+04	1.6	60.08	2.17	2.11	32.83	1.22	7.88	0
MW34	10/23/2007	3.57E+04	4.7	54.5	0.45	2.73	32.32	5.32	1.60	0.17
MW34	3/25/2008	3.23E+05	4.65	65.59	2.53	2.49	23.53	1.20	1.17	0.10
MW34	10/6/2008	1.23E+06	5.51	74.6	2.03	0.56	16.97	0.34	0.16	0.05
MW34	4/7/2009	2.30E+05	6.01	69.03	3.74	1.92	18.59	0.69	0.26	0.09
MW37	3/27/2008	1.97E+04	2.66	65.47	1.20	2.92	25.98	1.75	0.98	0.06
MW37	10/3/2008	1.63E+04	0.77	70.23	0	3.29	23.71	2	1.45	0.00

APPENDIX D
CUMULATIVE SITE ST-14 GROUNDWATER
DATA

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)
1A02		1	01/08/09	Jan-09	13.7	-123	0	9.23																				
1A11		1	01/01/08*	Jan-08															324									
1A11		1	03/27/08	Apr-08	14.36	-188.1	0.79	5.64											1560									
1A11		1	06/10/08	Jul-08	12.22	-26	0	6.05											726									
1A11		1	04/14/09	Apr-09	14.25	-58	0.21	5.82											173									
1A17		1	01/08/09	Jan-09	17.92	-95	0	8.82																				
1B11		1	01/01/08*	Jan-08															1570									
1B11		1	03/27/08	Apr-08	13.88	-82.1	0.59	5.79											2020									
1B11		1	06/10/08	Jul-08	11.81	46	0	5.6											505									
2A01		2	10/31/08	Oct-08	12.74	-179	0	7.29	8.65	147	0.255 J	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U										
2A06		2	06/11/08	Jul-08	10.35	-84.7	0.73	6.27											670									
2B04		2	10/31/08	Oct-08	12.44	-71	0	5.72	1.87	1170 J	1.3	1 U	1 U	0.777	1 U	2 U	1 U	1 U										
2B04		2	01/14/09	Jan-09	12.14	-77	0	8.29																				
2B05		2	01/01/08*	Jan-08															283									
2B05		2	03/27/08	Apr-08	11.92	-142.4	0.62	6.48											896									
2B05		2	06/11/08	Jul-08	10.29	-97.5	0.61	6.13											776									
2B05		2	04/15/09	Apr-09	11.86	-72	0.08	6.31											8.35									
2B16		2	01/14/09	Jan-09	11.94	-113	0	9.01																				
3A05		3	01/21/08	Jan-08	16.75	18.1	1.19	5.9											29.4									
3A05		3	03/26/08	Apr-08	16.24	55	0.11	5.58											241									
3A05		3	06/10/08	Jul-08	15.22	43	0.01	5.86											69.3									
3A05		3	10/02/08	Oct-08	16.02	-68	0	6.26											26.3									
3A05		3	01/14/09	Jan-09	16.11	-95	0	8.85																				
3A05		3	04/15/09	Apr-09	16.32	-2	1.16	5.64											21.9									
3A16		3	01/21/08	Jan-08	16.34	-113.7	1.98	6.31											21400									
3A16		3	03/26/08	Apr-08	16.1	-202.7	0.5	6.09											181000									
3A16		3	06/10/08	Jul-08	14.95	-75	0	6.31											3260									
3A16		3	10/02/08	Oct-08	15.98	-109	0	6.69											338									
3A16		3	04/15/09	Apr-09	16.07	-31	0.28	6.11											119									
3A20		3	10/31/08	Oct-08	17.4	-111	0	6.26	170	3.3	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U										
3A24		3	10/31/08	Oct-08	17.34	-129	0	6.49	258 J	8.53	1 U	1 U	1 U	0.143 J	1 U	2 U	1 U	1 U										
3A24		3	01/14/09	Jan-09	17.45	-64	0	5.51																				
3A24		3	04/17/09	Apr-09	17	-31	0.07	5.4											14.8									
4A16		4	01/14/09	Jan-09	19.76	-76	0	8.74																				
5A02		5	01/21/08	Jan-08	19.53	-179	0.11	6.16											1420									
5A02		5	03/26/08	Apr-08	18.71	-348	1.26	6.26											5520									
5A02		5	06/10/08	Jul-08	16.84	-88.7	0.38	5.5											809									
5B01		5	01/08/09	Jan-09	19.6	-113	0	8.99																				
5B03		5	01/21/08	Jan-08	20.75	-26.2	0.61	5.87											307									
5B03		5	03/26/08	Apr-08	19.45	-188	0.73	5.79											1050									
5B03		5	06/10/08	Jul-08	17.62	7	0	5.94											85.6									
5B03		5	10/02/08	Oct-08	19.25	-73	0	6.35											323									
5B03		5	04/14/09	Apr-09	19.22	-122	0	6.14											250									
5B08		5	01/08/09	Jan-09	19.61	-67	0	8.5																				

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)	
6A01		6	01/14/09	Jan-09	19.71	47	0	7.03																					
6A05		6	01/14/09	Jan-09	19.79	0	0	5.53																					
6B03		6	01/21/08	Jan-08	18.86	-153	0.15	5.45											279										
6B03		6	03/26/08	Apr-08	18	-101	0.31	6.13											260										
6B03		6	06/10/08	Jul-08	16.27	26.7	0.3	4.76											175										
6B03		6	10/02/08	Oct-08	17.88	-103	0	6.79											33.6										
6B03		6	04/16/09	Apr-09	12.48	-122	0	5.92											23.6										
7A03		7	06/12/08	Jul-08	17.35	63	0	5.69											1260										
7A03		7	01/14/09	Jan-09	18.93	-110	0	6.05																					
7A04		7	03/28/08	Apr-08	18.37	44	-0.02	5.28											4410										
7A04		7	04/15/09	Apr-09	19.42	-68	0.1	6.23											75										
7A09		7	01/14/09	Jan-09	20.4	112	0	6.06																					
10A01		10	04/06/10	Apr-10	8.43	-210	1.96	7.29	20	192	0.262 J	1.04	1 U	0.4 U	1 U	2 U	1 U	1 U											
10A02		10	04/06/10	Apr-10	8	-176	0	7.05	34.7	675	0.827 J	7.9	1 U	0.4 U	1 U	2 U	1 U	1 U											
10A03		10	04/06/10	Apr-10	8.76	-183	0	7.02	28.3	559	0.605 J	3.46	1 U	0.237 J	1 U	2 U	1 U	1 U											
10A04		10	04/06/10	Apr-10	7.55	-184	0	6.9	1.54	1230	0.772 J	5.32	1 U	0.577	1 U	2 U	1 U	1 U											
IP1A	1		02/28/06	Mar-06	12.99	-386.8	1.03	5.75	496	30.7	1 U	1 U	1 U	0.159 J	1 U	2 U	1 U	0.408 J	2.9	3.52	2.53		3.47	4.05					
IP1A	1		06/28/06	Jun-06	13.64	-24.43	1.94	5.2	568	42.4	0.336 J	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3110	2.38	17.3		0.5 U	1.38					
IP1A	1		08/31/06	Aug-06	13.81	-70	0.49	5.16	524	38	0.293 J	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	4120	1.15 J	17.8		0.509	50.8					
IP1A	1		10/11/06	Oct-06	13.36	-54.33	0.61	5.42	408	31.3	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	9010	2.4 U	17.7		0.397 J	65.3					
IP1A	1		10/24/07	Nov-07	14.59	-98	0.03	6.58	43.8	199	1 U	2.88	1 U	0.4 U	1 U	2 U	1 U	1 U	2440	0.6 U	1.2	0.994	2.31	6460	259	0.01 U	221	0.354	
IP3A	3		02/28/06	Mar-06	18.45	303.9	1.29	5.18	51	25.9	1 U	0.374 J	21.1	0.4 U	1 U	2 U	1 U	0.27 J	3.85	1.96	1.98		0.5 U	0.872					
IP3A	3		06/28/06	Jun-06	18.99	161.1	0.36	4.82	23.5	12.3	1 U	1 U	1.71	0.4 U	1 U	2 U	1 U	0.272 J	455	0.6 U	2.83		0.5 U	2.89					
IP3A	3		08/31/06	Aug-06	19.22	46.9	1.32	5.48	20.7	9.88	1 U	1 U	0.807 J	0.4 U	1 U	2 U	1 U	1 U	792	3 U	5 U		0.5 U	0.663					
IP3A	3		10/10/06	Oct-06	18.89	-99.17	0.79	5.54	10	5.07	1 U	1 U	1 U	0.232 J	1 U	2 U	1 U	1 U	2820	2.4 U	3.44 J		0.5 U	0.722					
IP3A	3		10/24/07	Nov-07	20.62	-19	0.05	5.8	0.982 J	2.61	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	574	0.6 U	1 U	1.21	1.5	1080	817	0.0323	138	0.0913	
IP3A	3		01/31/08	Jan-08	20.72	14	0.22	5.41	1.11	2.99	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1270										
MP1A	1		03/01/06	Mar-06	13	11.8	1.09	5.65	417	26.3	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	0.34 J	4.88	3.54	3.72		1.23	4.38					
MP1A	1		06/28/06	Jun-06	13.75	-25.83	0.94	5.17	504	33.4	0.253 J	1 U	1 U	0.4 U	1 U	2 U	1 U	0.26 J	81.3	2.79	2.34		0.325 J	4.88					
MP1A	1		08/31/06	Aug-06	13.76	-4.9	0.79	5.05	464	33.1	0.284 J	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3060	3 U	26.2		0.851	1.99					
MP1A	1		10/11/06	Oct-06	13.38	-42.3	0.37	5.29	429	38.3	0.374 J	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6070	2.4 U	19.4		0.689	8.38					
MP2A	2		03/01/06	Mar-06	17.31	-35.7	0.69	4.93	506	21.5	1 U	1 U	0.406 J	0.183 J	1 U	2 U	1 U	0.505 J	5.69	1.45	10.8		0.535	26.8					
MP2A	2		06/27/06	Jun-06	17.59	139.5	1.02	4.48	509	20.9	1 U	1 U	0.316 J	0.173 J	1 U	2 U	1 U	0.445 J	204	0.348 J	52.7		0.645	57.7					
MP2A	2		09/06/06	Aug-06	17.48	-41.8	0.54	5.32	226	9.05	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	16000	0.536 J	60.2		0.593	12.9					
MP2A	2		10/09/06	Oct-06	17.29	-37.47	0.68	4.68	176	7.81	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	0.269 J	11400	0.504 J	32.5		0.316 J	23.3					
MP2B	2		03/03/06	Mar-06	17.56	134.4	0.77	4.57	635	21.1	1 U	1 U	0.451 J	0.175 J	1 U	2 U	1 U	0.34 J	6.66	1.22	6.33		0.63	27.6					
MP2B	2		06/27/06	Jun-06	17.78	-3.4	1.18	4.78	510	21.9	1 U	1 U	0.435 J	0.195 J	1 U	0.512 J	1 U	0.657 J	10.4	0.882	15.2		0.414 J	33.9					
MP2B	2		09/01/06	Aug-06	17.73	-14.1	0.34	4.78	612	19	1 U	1 U	0.393 J	0.126 J	1 U	2 U	1 U	1 U	5810	3 U	140		0.386 J	26					
MP2B	2		10/09/06	Oct-06	18.02	-35.57	0.24	5.02	491	19.6	1 U	1 U	1 U	0.15 J	1 U	2 U	1 U	1 U	4560	2.4 U	59		0.263 J	40.3					
MP2B	2		04/09/08	Apr-08	17.9	-49	0	6.03	258	190	5 U	5 U	5 U	2 U	5 U	10 U	5 U	2.01 J	1510	0.246	5 U	0.5 U	0.735	2130	2320	0.0385	276	1.85	
MP2B	2		07/16/08	Jul-08	16.52	-139	1.3	6.5	109	198	2 U	2 U	2 U	0 U	2 U	4 U	2 U	2 U	2100	0.254	ND	ND	ND	9470	1270	0.0378	367	1.67	
MP2B	2		10/08/08	Oct-08	16.93	-156	0	6.94	48.3	316	2 U	2 U	2 U	0.8 U	2 U	4 U	2 U	2 U	1000	0.05 U	5 U	5 U	0.253 J	144	2120	0.02 U	165	0.512	
MP2B	2		01/14/09	Jan-09	18.98	-130	0	6.31	18.1	346	2 U	2 U	2 U	0.8 U	2 U	4 U	2 U	2 U	590	0.14 J	25 U	5 U	0.329 J	11100	1280	0.02 U	126	0.317	
MP2B	2		04/13/09	Apr-09	20.45	-169	0.58	6.48	24.5	312	2.5 U	2.5 U	2.5 U	1 U	2.5 U	5 U	2.5 U	2.5 U	571	0.769	5 U	5 U	5 U	13500	767	0.01	79	0.22	

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)	
MP2C	2		03/03/06	Mar-06	17.99	216.5	2.25	5.04	739	20	1 U	1 U	0.81 J	0.179 J	1 U	2 U	1 U	0.738 J	5.22	1.39	7.6		0.744	13.4					
MP2C	2		06/27/06	Jun-06	18.25	293.43	2.28	4.76	722	26.9	1 U	1 U	0.614 J	0.21 J	1 U	0.712 J	0.277 J	0.806 J	3.64	1.61	6.84		0.483 J	44.8					
MP2C	2		09/01/06	Aug-06	18.35	34.7	9.06	4.36	483	23.6	1 U	1 U	0.396 J	0.141 J	1 U	2 U	1 U	0.267 J	1040	3 U	115		0.5 U	27.8					
MP2C	2		10/09/06	Oct-06	17.95	56	0.84	5.16	772	25.9	1 U	1 U	0.266 J	0.147 J	1 U	2 U	1 U	0.297 J	2500	2.4 U	68.8		0.291 J	49.4					
MP2C	2		01/31/08	Jan-08	22.08	7	0.16	5.4	962	36.3	0.453 J	1 U	1 U	0.17 J	1 U	2 U	1 U	1 U	7.53										
MP2C	2		04/10/08	Apr-08	23.25	4	0.18	5.81	736	388	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U					0.92	1810	234	0.0083	34	0.104	
MP2C	2		07/16/08	Jul-08	17.16	-119	1.75	6.5	701	296	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	8.43	0.184	ND	ND	ND	7500	172	0.00799 J	29.5	0.0845	
MP2C	2		10/08/08	Oct-08	18	-52	0	6.44	350 J	540 J	4 J	2 UJ	2 UJ	0.8 UJ	2 UJ	4 UJ	2 UJ	2 UJ	4.13	0.34	5 U	25 U	25 U	5370 J	124	0.01 U	37.4	0.118	
MP2C	2		01/14/09	Jan-09	18.99	-64	0	6.01	491	402	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	3.71	0.247	25 U	5 U	1.12 J	4600	216	0.01 U	36.9	0.119	
MP2C	2		04/13/09	Apr-09	21.45	-51	0.59	5.78	971	288	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	6.17	0.108	5 U	5 U	5 U	2200	144	0.01 U	29.3	0.0807	
MP3A	3		02/27/06	Mar-06	18.68	123.8	1.36	4.96	30.1	15	1 U	1 U	11.7	0.4 U	1 U	2 U	1 U	1 U	3.86	2.11	0.721 J		0.5 U	0.634					
MP3A	3		06/29/06	Jun-06	19.36	366.47	1.44	4.63	26.7	12.7	1 U	1 U	11	0.4 U	1 U	2 U	1 U	1 U	4.42	2.3	0.979 J		0.5 U	0.259 J					
MP3A	3		09/01/06	Aug-06	19.5	-261.2	0.42	5.11	30.1	13.3	1 U	1 U	18.1	0.4 U	1 U	2 U	1 U	1 U	51.2	0.371 J	0.521 J		0.301 J	0.617					
MP3A	3		10/10/06	Oct-06	19.18	1.07	5.14	3.83	28.6	13.9	1 U	1 U	21.2	0.4 U	1 U	2 U	1 U	1 U	693	2.4 U	17.6		0.5 U	1.53					
MP3A	3		04/09/08	Apr-08	19.42	-82	0.06	11.35	2.08	0.937 J	1 U	1 U	0.665 J	0.314 J	0.591 J	1.64 J	1.63	1.57	50.3	1.61	6.68	0.5 U	0.5 U	37.3	821	0.01 U	0.0819 J	0.01 U	
MP3A	3		07/15/08	Jul-08	18.55	-39	1.27	6.44	18.9	10.8	1 U	1 U	5.01	0 U	1 U	2 U	1 U	1 U	9.9	1.59	ND	ND	ND	335	217	ND	0.394	0.0311	
MP3A	3		10/09/08	Oct-08	19.4	29	0	5.93	25.8 J	12 J	1 UJ	1 UJ	4.02 J	0.4 UJ	1 UJ	2 UJ	1 U	1 UJ	5.48	1.41	5 U	5 U	5 U	414	131	0.01 U	0.917	0.0546	
MP3A	3		01/14/09	Jan-09	19.73	-22	0	5.51	29	14.4	1 U	1 U	1.99	0.4 U	1 U	2 U	1 U	1 U	15.2	0.339	5 U	5 U	5 U	664	125	0.01 U	20	0.123	
MP3A	3		04/10/09	Apr-09	19.52	-66	0.53	5.64	30.7	15.7	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	74.4	0.467	15.7	5 U	5 U	636	261	0.0141	57.1	0.17	
MP3B	3		02/27/06	Mar-06	18.44	150.9	0.92	5.09	51.4	26.9	1 U	0.328 J	22.3	0.4 U	1 U	2 U	1 U	1 U	3.79	1.93	1.44		0.5 U	0.886					
MP3B	3		06/29/06	Jun-06	19.14	0.93	0.93	5.2	44.2	22.9	1 U	1 U	13.9	0.4 U	1 U	2 U	1 U	1 U	107	0.6 U	2.46		0.5 U	0.485 J					
MP3B	3		08/31/06	Aug-06	19.37	-286.2	0.31	5.28	38	17.7	1 U	0.279 J	16.6	0.4 U	1 U	2 U	1 U	1 U	686	3 U	6.78		0.5 U	0.425 J					
MP3B	3		10/10/06	Oct-06	18.99	-34.7	3.34	4.89	15.6	9.46	1 U	1 U	2.85	0.4 U	1 U	2 U	1 U	1 U	4860	2.4 U	6.95		0.5 U	3.39					
MP3B	3		01/31/08	Jan-08	19.92	-58	0.08	6.13	22.7	13.9	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	72										
MP3B	3		04/10/08	Apr-08	19.23	-24	0.01	5.89	27.5	18	1 U	0.444 J	0.509 J	0.4 U	1 U	2 U	1 U	1 U											
MP3B	3		07/15/08	Jul-08	18.54	-91	1.13	6.11	34.3	21.5	0.672 J	0.41 J	0.855 J	0 U	1 U	2 U	1 U	1 U	52.7	0 ND	ND	ND	ND	2310	153	0.0131	73	0.0577	
MP3B	3		10/09/08	Oct-08	19.23	-64	0	5.94	38.1	20.1	1 U	0.541 J	1 U	0.4 U	1 U	2 U	1 U	1 U	42.5	0.434	5 U	25 U	25 U	5360 J	214	0.01 U	90.7	0.0648	
MP3B	3		01/12/09	Jan-09	19.51	-2		5.79	32.4	15.5	1 U	0.602 J	1 U	0.4 U	1 U	2 U	1 U	1 U	116	0.074	25 U	5 U	0.303 J	4430	422	0.01 U	158	0.167	
MP3B	3		04/10/09	Apr-09	19.32	-146	0.39	6.18	37.1	18.4	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	235	0.542	5 U	5 U	5 U	6850	752	0.0313	177	0.606	
MP3C	3		02/28/06	Mar-06	18.92	48.8	1.39	4.83	36.9	18.5	1 U	1 U	16.9	0.4 U	1 U	2 U	1 U	1 U	3.88	2.1	0.806 J		0.5 U	0.407 J					
MP3C	3		06/29/06	Jun-06	19.52	346.33	1.14	4.73	32	16.3	1 U	1 U	18.1	0.4 U	1 U	2 U	1 U	1 U	7.44	1.79	1.03		0.5 U	0.5 U					
MP3C	3		09/06/06	Aug-06	19.6	66.7	0.59	4.77	37.5	16.5	1 U	1 U	33.1	0.4 U	1 U	2 U	1 U	1 U	478	0.6 U	7.06		0.5 U	0.603					
MP3C	3		10/10/06	Oct-06	19.37	-131.9	0.3	5.43	31	15.1	1 U	1 U	19.9	0.4 U	1 U	2 U	1 U	1 U	3310	2.4 U	21.8		0.5 U	3.65					
MW01		BTEX	01/01/91*	Jan-91					7				12	ND															
MW01		BTEX	1/1/1992*	Jan-92					4				9	ND															
MW01		BTEX	01/01/99*	Jan-99					16				9	ND															
MW01		BTEX	01/01/00*	Jan-00					19				9.5	ND															
MW01		BTEX	03/01/06	Mar-06	15.32	459.3	1.28	4.42	75.1	3.33	1 U	1 U	7.21	0.4 U	1 U	2 U	1 U	1 U											
MW01		BTEX	11/02/07	Nov-07	15.7	464	1.6	4.48											0.96 J	3.1	20.7	0.5 U	0.5 U	0.5 U	15.6	0.01 U	0.272	0.0584	
MW01		BTEX	04/07/08	Apr-08	15.4	275	1.14	4.05	21.4	3.16	1 U	1 U	4.61	0.4 U	1 U	2 U	1 U	1 U	1.43	2.47	5.55	0.5 U	0.5 U	0.5 U	10 U	0.01 U	2.49	0.0706	
MW01		BTEX	07/11/08	Jul-08	15.37	401	1.73	4.23	29.3	4.17	1 U	1 U	6.1	0 U	1 U	2 U	1 U	1 U	6.82	2.1	ND	ND	ND	ND	6.2 J	ND	0.327	0.059	
MW01		BTEX	10/07/08	Oct-08	15.56	420	0	4.2	26.9 L	2.61 L	1 UL	1 UL	4.63 L	0.4 UL	1 UL	2 UL	1 UL	1 UL	3.48	2.3	3.85 J	5 U	1.25 J	3000 J	5.85 J	0.01 U	0.358	0.0535	
MW01		BTEX	01/12/09	Jan-09	15.55	384	0.52	3.92	23.3	2.61	1 U	1 U	5.44	0.4 U	1 U	2 U	1 U	1 U	2.14	2.46	3.81 J	5 U	5 U	5 U	11.5	0.01 U	0.1	0.0585	
MW01		BTEX	04/15/09	Apr-09	15.65	397	0.98	3.94	24.6	2.75	1 U	1 U	5.44	0.4 U	1 U	2 U	1 U	1 U	4.55	2.4	3.47 J	5 U	5 U	5 U	19.3	0.01 U	0.143	0.0652	

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)	
MW01		BTEX	07/28/09	Jul-09	15.4	391	0	4.28	34.6	4.75	1 U	1 U	6.42	0.4 U	1 U	2 U	1 U	1 U	10.8	1.76	4.61 J	5 U	5 U	5 U	7.93 J	0.01 U	0.476	0.0541	
MW01		BTEX	10/16/09	Oct-09	15.46	394	2.87	4.14	30.3	4.89	1 U	1 U	5.84	0.4 U	1 U	2 U	1 U	1 U	6.63	1.88	3.04 J	5 U	5 U	5 U	5.54 J	0.01 U	0.419	0.0535	
MW01		BTEX	04/08/10	Apr-10	14.5	389	0	3.98	29.6	5.04	1 U	1 U	11.6	0.4 U	1 U	2 U	1 U	1 U	6.56	1.7	5 U	5 U	5 U	5 U	7.8 J	0.0404	5.27	0.042	
MW02		BTEX	01/01/91*	Jan-91					ND				ND	280															
MW02		BTEX	1/1/1992*	Jan-92					ND				ND	50															
MW02		BTEX	01/01/96*	Jan-96					ND				ND	ND															
MW02		BTEX	01/01/99*	Jan-99					12				ND	360															
MW02		BTEX	01/01/00*	Jan-00					17				ND	380															
MW02		BTEX	03/01/06	Mar-06	13.47	401.8	3.92	4.30	4.44	1 U	1 U	1 U	1 U	22.3	21.5	4.96	1 U	0.283 J											
MW02		BTEX	11/02/07	Nov-07	14.36	52	0.36	5.46											2.89	0.6 U	13.2	0.395 J	0.54	60.2	75	0.01 U	46.6	0.218	
MW02		BTEX	04/07/08	Apr-08	13.37	214	4.98	4.12	0.381 J	1 U	1 U	1 U	1 U	0.352 J	1 U	2 U	1 U	1 U	2.42	0.448	40.6	0.5 U	0.5 U	0.5 U	10 U	0.01 U	1.4	0.125	
MW02		BTEX	07/11/08	Jul-08	13.61	134	1.58	5.39	23.6	3.34	1 U	1 U	1 U	120	32.4	4.21	1.1	2.84	7.2	0.091	22.8	ND	0.276 J	31	28.6	ND	17.4	0.193	
MW02		BTEX	10/07/08	Oct-08	14.18	36	0	5.82	39.4	4.96	1 U	1 U	1 U	206 J	20.3	4.1	2.82	6.35	4.87	0.107	11.7	5 U	0.762 J	5 J	70.8	0.01 U	51.6	0.225	
MW02		BTEX	01/13/09	Jan-09	13.88	181	3.5	5.29	12.3	1.66	1 U	1 U	1 U	64.2	5.47	1.13 J	1 U	0.865 J	5.35	0.303	28.2	5 U	5 U	5.97	27.9	0.01 U	10.2	0.0962	
MW02		BTEX	04/16/09	Apr-09	12.57	236	5.44	4.11	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.51	0.252	39	5 U	5 U	5 U	24	0.01 U	0.0617 J	0.104	
MW02		BTEX	07/22/09	Jul-09	13.79	95	0	5.3	30.9	3.82	1 U	1 U	1 U	165	67.2	17.3	5.66	9.13	1.89	0.194	29.3	5 U	5 U	25.6	27	0.01 U	16.3	0.172	
MW02		BTEX	10/16/09	Oct-09	13.87	-27	2.27	5.66	32.8	4.12	2 U	2 U	2 U	204	112	1.46 J	5.5	12	11.2	0.939	20.7	5 U	5 U	40.7	68.6	0.01 U	46.1	0.19	
MW02		BTEX	04/08/10	Apr-10	12.31	384	1.15	4.4	5.77	0.479 J	1 U	1 U	1 U	15.4	20.4	20.4	4.31	2.59	7.77	0.045 J	31.9	5 U	5 U	3.65 J	8.51 J	0.0554	13.9	0.0368	
MW02-3188			01/09/09	Jan-09	12.25	-82	0	5.8	1 U	1 U	1 U	1 U	1 U	0.255 J	0.432 J	2 U	0.43 J	1 U											
MW03		BTEX	01/01/91*	Jan-91					81				ND	3400															
MW03		BTEX	1/1/1992*	Jan-92					49				ND	3000															
MW03		BTEX	01/01/96*	Jan-96					157				ND	1734															
MW03		BTEX	01/01/99*	Jan-99					47				ND	1500															
MW03		BTEX	01/01/00*	Jan-00					37				1.3	1100															
MW03		BTEX	02/28/06	Mar-06	24.34	144.9	0.72	4.59	61.6 J	2.66 J	1 UJ	1 UJ	1 UJ	154 J	2.98 J	2.41 J	1.08 J	4.64 J											
MW03		BTEX	10/24/07	Nov-07	25.7	309	0.05	4											1.56	0.6 U	23.5	0.468 J	0.536	109	8.23 J	0.01 U	0.351	0.045	
MW03		BTEX	01/01/08*	Jan-08					65.7	2.61	1 U	1 U	1 U	86.3	2.73	2 U	0.395 J	2.55	1.86	0	42.4	0.5 U	0.5 U	44.1	10.9	0.01 U	0.55	0.042	
MW03		BTEX	04/04/08	Apr-08	24.84	194	0.04	4.1	61.9	2.81	1 U	1 U	1 U	72.2	2.09	0.596 J	0.408 J	3	7.21	0.05 U	13.7	0.351 J	0.385 J	75.7	17.3	0.01 U	0.568	0.047	
MW03		BTEX	07/09/08	Jul-08	24.1	230	2.2	4.42	59.9	2.83	1 U	1 U	0.903 J	69.8	1.95	1.84	0.841	2.21	4.69	0.097	12.8	0.385 J	0.449 J	77.8	33.2	ND	0.472	0.0489	
MW03		BTEX	10/01/08	Oct-08	24.9	272	0	4.22	74.1	3.26	1 U	1 U	0.393 J	60.6	3.42	3.3	1.57	6.56	7.18	0.114	10.6	0.445 J	0.579 J	47.6	U	0.01 U	0.554	0.0552	
MW03		BTEX	01/06/09	Jan-09	25.15	327	0	4.01	64.7	3.46	1 U	1 U	1 U	60.7	1.93	0.608 J	0.349 J	2.2	2.85	0.074	8.81	0.284 J	0.376 J	45	13.6	0.01 U	0.562	0.0633	
MW03		BTEX	04/09/09	Apr-09	24.97	217	0	4.01	63.1	3.58	1 U	1 U	0.33 J	46.6	1.11	2 U	1 U	1.69	5.19	0.144	11.1	5 U	5 U	40.1	38.6	0.01 U	0.6	0.0679	
MW03		BTEX	07/24/09	Jul-09	24.24	210	0.7	4.35	48.8	3.54	1 U	1 U	0.346 J	45.5	0.902 J	2 U	1 U	1.28	8.74	0.193	21.6	5 U	5 U	1040	86.5	0.01 U	28.3	0.0503	
MW03		BTEX	10/15/09	Oct-09	24.54	276	0	4.46	55.8	3.79	1 U	1 U	1 U	37.8	1.02	2 U	1 U	1.41	5.68	0.05 U	12.8	5 U	5 U	24.5	U	0.0435	1.45	0.0522	
MW03		BTEX	04/06/10	Apr-10	22.56	284	3.55	4.77	45.5	2.96	1 U	1 U	0.273 J	20	0.739 J	2 U	1 U	0.8 J	6.73	0.266	14.3	5 U	5 U	13.4	10.9	0.01 U	1.21	0.0652	
MW03-3471			03/01/06	Mar-06	17.82	70.7	0.04	5.58	1 U	1 U	1 U	1 U	1 U	14.8	6.52	2 U	1 U	1 U											
MW03-3471			04/04/08	Apr-08	18.24	19.1	0.4	5.57	1 U	1 U	1 U	1 U	1 U	42.5	39.9	0.938 J	0.611 J	0.35 J	9.29	0.05 U	57.2	50 U	50 U	4820	105	0.0079 J	31.4	0.0904	
MW03-3471			07/11/08	Jul-08	17.02	-30	1.37	5.81	1 U	1 U	1 U	1 U	1 U	36.2	33.1	2 U	1 U	1 U	11.3	0 ND	29.5	ND	1.03	4640	85.6	0.00745 J	31.1	0.0762	
MW03-3471			10/07/08	Oct-08	18.21	-68	0	5.76	0.253 J	1 U	1 U	1 U	1 U	49.3	39.2	0.544 J	1 U	1 U	10.2	3.23	27.2	1.06 J	1.17 J	106	101	0.01 U	42.4	0.105	
MW03-3471			01/13/09	Jan-09	18.55	-23	0	5.47	1 U	1 U	1 U	1 U	1 U	37.6	31.1	2 U	1 U	1 U	8.99	3.24	43.2	5 U	0.461 J	1810	138	0.01 U	33.3	0.0699	
MW03-3471			04/13/09	Apr-09	18.09	-29	3.95	5.54	1 U	1 U	1 U	1 U	1 U	47.7	15.9	0.806 J	1 U	1 U	10	0.05 U	20.7	5 U	5 U	3660	123	0.0738	50.3	0.0862	
MW03-3471			07/22/09	Jul-09	17.14	-51	6.85	6.09	1 U	1 U	1 U	1 U	1 U	21.7	14.8	2 U	1 U	0.27 J	7.25	0.05 U	13.3	5 U	5 U	39.3	24.1	0.01 U	0.662	0.0721	
MW03-3471			10/13/09	Oct-09	17.46	-64	0	5.89	1 U	1 U	1 U	1 U	1 U	54	11.6	2 U	1 U	1 U	17.4	0.187	22.4	5 U	5 U	8590	129	0.01 U	50.5	0.0855	
MW03-3471			04/08/10	Apr-10	14.45	-64	2.91	6.17	1 U	1 U	1 U	1 U	1 U	34.4	15.1	2 U	0.554 J	1 U	15	0.221	18.1	5 U	5 U	9830	110	0.01 U	30.1	0.0472	

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)	
MW04		BTEX	01/01/91*	Jan-91					53				ND	1700															
MW04		BTEX	1/1/1992*	Jan-92					ND				ND	3500															
MW04		BTEX	01/01/96*	Jan-96					94.7				ND	1547															
MW04		BTEX	01/01/99*	Jan-99					ND				ND	3800															
MW04		BTEX	01/01/00*	Jan-00					160				ND	3700															
MW04		BTEX	02/28/06	Mar-06	23.65	-102.1	0.81	6.28	63.6 J	1.83 J	1 UJ	1 UJ	1 UJ	837 J	698 J	2510 J	960 J	4070 J											
MW04		BTEX	10/22/07	Nov-07	24.84	-89	0.04	6.38											8.18	0.6 U	1.15	0.738	0.675	88.1	108	0.01 U	89.8	0.142	
MW04		BTEX	01/01/08*	Jan-08					32.2	5.26	1 U	1 U	1 U	855	644	2120	860	3010	6.75	0	5 U	0.55	0.512	71.6	71.2	0.0117	87.9	0.133	
MW04		BTEX	04/04/08	Apr-08	24.14	-13.1	0.04	5.86	25.7	25 U	25 U	25 U	25 U	876	595	1830	756	2600	7.22	0.366	5 U	0.678	0.747	64	115	0.0097 J	63.7	0.136	
MW04		BTEX	07/09/08	Jul-08	23.29	-76	1.37	6.02	28.5	25 U	25 U	25 U	25 U	655	401	1320	552	2200	10	0.505	ND	1.47	1.47	142	89.5	0.0154	84.7	0.138	
MW04		BTEX	10/03/08	Oct-08	24.5	-74	0	6.31	21.9	3.88	1 U	1 U	1 U	648 J	595 J	1230 J	753 J	1200 J	10.4	0.104	5 U	3.17 J	25 U	1020	144	0.01 U	98.5	0.181	
MW04		BTEX	01/06/09	Jan-09	24.39	-42	0.6	5.76	17.8 J	20 U	20 U	20 U	20 U	502	449	1540	670	1840	4.58	0.433	5 U	0.275 J	0.375 J	27.1	62.3	0.0076 J	77.4	0.158	
MW04		BTEX	04/08/09	Apr-09	24.2	-110	0	5.87	28	10 U	10 U	10 U	10 U	642	570	2020	795	2540	10.6	0.047 J	5 U	5 U	5 U	41	42.4	0.0185	101	0.178	
MW04		BTEX	07/30/09	Jul-09	23.45	-107	0.71	5.94	97.8	2.81 J	5 U	5 U	5 U	441	512	1630	651	1930	4.61	0.65	5 U	5 U	5 U	28.4	114	0.01 U	91.2	0.155	
MW04		BTEX	10/15/09	Oct-09	23.64	-119	0	6.75	187	20 U	20 U	20 U	20 U	428	462	1630	629	1870	7.6	5.3	11.3	5 U	5 U	39.9	132	0.0086 J	97	0.138	
MW04		BTEX	04/06/10	Apr-10	21.78	-122	1.33	7.06	135	10 U	10 U	10 U	10 U	247	733	2870	1010	1980	8.08	0.081	37.9	5 U	5 U	36.2	65.4	0.0098 J	80	0.124	
MW05		BTEX	01/01/91*	Jan-91					24				26	330															
MW05		BTEX	1/1/1992*	Jan-92					55				33	330															
MW05		BTEX	01/01/96*	Jan-96					34.5				ND	420															
MW05		BTEX	01/01/99*	Jan-99					64				18	150															
MW05		BTEX	01/01/00*	Jan-00					14				4.2	39															
MW05		BTEX	02/28/06	Mar-06	18.24	21.2	1.64	5.72	11.3	1.71	1 U	1 U	1.29	45.1	14.2	20.4	7.62	35.7											
MW05		BTEX	10/22/07	Nov-07	19.39	271	8.08	6.67											10.5	2.79	19.6	0.341 J	0.5 U	16.5	115	0.01 U	1.92	0.0301	
MW05		BTEX	01/01/08*	Jan-08					21.8	4.21	1 U	1 U	2.91	59.5	26.7	38	15.5	59.2	8.45	0	17.6	0.5 U	0.5 U	7.61	72.5	0.01 U	2.51	0.042	
MW05		BTEX	03/28/08	Apr-08	18.42	135	2.27	5.62	14.1	2.7	1 U	1 U	4.43	32.8	13.7	18.3	7.77	37.9	9.34	0.392	25	0.5 U	0.5 U	3.48	74.5	0.01 U	3	0.0281	
MW05		BTEX	07/11/08	Jul-08	17.82	62	4.69	5.87	20	4.11	1 U	1 U	6.09	29.6	22.1	41	14.5	55.1	10.4	0.466	21.1	ND	ND	6.25	103	ND	2.12	0.048	
MW05		BTEX	10/06/08	Oct-08	18.65	80	9.35	6.19	49.9	11.4	1 U	1 U	9.35	22.8	15.6	26.9	9.81	25.7	4.06	0.05 U	26.5	25 U	25 U	25 J	75.9	0.01 U	2.58	0.0569	
MW05		BTEX	01/06/09	Jan-09	18.9	77	8.06	5.35	49.5	12.8	1 U	1 U	10.7	54.9	27.9	44.4	16.9	43.5	7.59	0.66	21	5 U	5 U	10.2	67.2	0.01 U	5.23	0.0897	
MW05		BTEX	04/10/09	Apr-09	18.65	63	4.35	5.64	23.1	6.47	1 U	1 U	4.8	32.5	16	26.4	9.97	23.4	10.8	0.167	18.6	5 U	5 U	10.5	70.1	0.01 U	3.5	0.0609	
MW05		BTEX	07/27/09	Jul-09	17.89	-26	4.88	5.99	32.5	8.56	1 U	1 U	5.49	33.7	15.9	31.5	11.9	27	13.5	0.23	22.1	5 U	5 U	46.5	94.2	0.01 U	6	0.0859	
MW05		BTEX	10/15/09	Oct-09	18.1	69	1.87	5.99	27.7	6.4	1 U	1 U	3.6	34.8	19.5	43.2	15	38.5	14.6	0.552	28	5 U	5 U	175	76.9	0.0579	3.28	0.0324	
MW05		BTEX	04/08/10	Apr-10	16.19	121	0.68	5.9	17.1	1.33	1 U	1 U	0.676 J	9.47	5.24	10.6	4.17	11.3	8.78	0.284	30.4	5 U	5 U	1.58 J	65.8	0.0368	1.04	0.0171	
MW06		BTEX	01/01/91*	Jan-91					68				42	ND															
MW06		BTEX	1/1/1992*	Jan-92					10				ND	ND															
MW06		BTEX	01/01/99*	Jan-99					7.7				2.4	0.2															
MW06		BTEX	01/01/00*	Jan-00					4.4				ND	ND															
MW06		BTEX	02/28/06	Mar-06	19.9	395.1	7.89	5.99	2.88	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW06		BTEX	10/25/07	Nov-07	21.05	280	5.71	4.94											0.932 J	0.484 J	14.7	0.5 U	0.5 U	8.49	29.9	0.01 U	1.02	0.0249	
MW06		BTEX	04/07/08	Apr-08	20.51	195.3	0.63	5.93	3.04	0.494 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.99	0.256	14.4	0.5 U	0.5 U	0.635	22.8	0.01 U	3.13	0.0072 J	
MW06		BTEX	07/09/08	Jul-08	18.41	215	3.83	6.29	5.33	1.37	1 U	1 U	1 U	0.162 J	1 U	1.73 J	0.606 J	1.59	3.78	0.142	17.2	ND	ND	2.65	54.5	ND	0.566	0.0194	
MW06		BTEX	10/06/08	Oct-08	20.38	171	1.3	5.17	5.33	1.11	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.69	0.143	24.7	5 U	5 U	1.72 J	28.9	0.01 U	0.905	0.0778	
MW06		BTEX	01/06/09	Jan-09	20.61	237	1.24	5.18	12.2	2.6	1 U	1 U	0.72 J	0.4 U	1 U	2 U	1 U	1 U	5.82	0.276	19.1	5 U	5 U	5 U	42.9	0.01 U	1.2	0.0538	
MW06		BTEX	04/08/09	Apr-09	20.42	192	6.4	5.51	4.63	0.871 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.17	0.111	19.4	5 U	5 U	5 U	180	0.01 U	0.611	0.0143	
MW06		BTEX	07/28/09	Jul-09	19.51	146	2.87	4.86	2.05	0.4 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	9.28	0.41	31.2	5 U	5 U	5 U	28.1	0.01 U	1.36	0.0662	

U, ND = Analyte not detected above MDL

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* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)
MW06		BTEX	10/15/09	Oct-09	19.76	183	1.46	5.25	1.72	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.84	0.279	28.4	5 U	5 U	5 U	17	0.01 U	0.86	0.0389
MW06		BTEX	04/05/10	Apr-10	17.66	180	4.48	6.14	1.27	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6.01	0.561	18.3	5 U	5 U	5 U	71.8	0.01 U	1.43	0.0076 J
MW07		BTEX	01/01/91*	Jan-91					15				4	2														
MW07		BTEX	1/1/1992*	Jan-92					61				18	4														
MW07		BTEX	01/01/96*	Jan-96					45.3				ND	ND														
MW07		BTEX	01/01/99*	Jan-99					800				1.8	4.8														
MW07		BTEX	01/01/00*	Jan-00					240				0.5	1.4														
MW07		BTEX	03/01/06	Mar-06	20.93	300.6	2.61	4.92	71.3	6.59	1 U	1 U	2.46	0.283 J	1 U	2 U	1 U	1 U										
MW07		BTEX	10/31/07	Nov-07	22.06	344	0.17	4.85											0.744 J	0.515 J	25.7	0.5 U	0.5 U	89.8	13.9	0.01 U	0.386	0.171
MW07		BTEX	01/01/08*	Jan-08					74.5	12.9	1 U	1 U	3.27	0.51	1 U	2 U	1 U	1 U	2.09	0	11.4	0.5 U	0.5 U	51.3	14.7	0.01 U	0.915	0.175
MW07		BTEX	04/07/08	Apr-08	21.47	383.3	0.12	4.39	62.1	7.15	1 U	1 U	1.85	0.319 J	1 U	2 U	1 U	1 U	1.99	0.933	9.1	0.5 U	0.5 U	16.1	12.5	0.01 U	5.25	0.152
MW07		BTEX	07/10/08	Jul-08	20.44	211	3.09	5.63	207	2.73	1 U	1 U	0.577 J	0.161 J	1 U	2 U	1 U	1 U	4.93	0.805	9.24	ND	ND	3.61	58	ND	2.08	0.0502
MW07		BTEX	10/06/08	Oct-08	21.3	199	8.79	5.65	631 J	3.99	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	8.08	0.654	9.5	25 U	25 U	25 J	41.8	0.01 U	3.41	0.0859
MW07		BTEX	01/06/09	Jan-09	21.6	190	1.5	5.35	825	3.78 J	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	1.83	0.887	6.85	5 U	5 U	5 U	39.2	0.01 U	0.915	0.0942
MW07		BTEX	04/07/09	Apr-09	21.4	207	6.06	5.52	780	7.16	5 U	5 U	1.68 J	2 U	5 U	10 U	5 U	5 U	6.61	0.574	7.6	5 U	5 U	5 U	46.5	0.0066 J	2.58	0.0501
MW07		BTEX/9	07/30/09	Jul-09	20.4	158	0	5.22	102	0.646 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.78	0.699	3.08 J	5 U	5 U	5 U	47.4	0.0055 J	1.01	0.0736
MW07		BTEX/9	10/14/09	Oct-09	20.76	137	7.48	6.06	36.2	0.271 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	8.64	0.591	16.9	5 U	5 U	5 U	U	0.01 U	4.44	0.0394
MW07		BTEX/9	04/09/10	Apr-10	18.77	340	6.26	6.19	20.4	29.8	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	4.31	0.814	3.13 J	5 U	5 U	5 U	44.8	0.0067 J	3.77	0.0265
MW08		BTEX	01/01/91*	Jan-91					54				ND	ND														
MW08		BTEX	1/1/1992*	Jan-92					69				11	ND														
MW08		BTEX	01/01/99*	Jan-99					170				ND	ND														
MW08		BTEX	01/01/00*	Jan-00					23				ND	ND														
MW08		BTEX	02/28/06	Mar-06	19.41	106.1	2.81	5.84	187	3.49	1 U	1 U	0.298 J	0.143 J	1 U	2 U	1 U	1 U										
MW08		BTEX	10/31/07	Nov-07	20.7	180	5.57	6.39											2.2	1.96	57.7	0.5 U	0.5 U	10.1	72.1	0.01 U	0.0658 J	0.0236
MW08		BTEX	04/04/08	Apr-08	19.98	129.3	8.4	6.8	8.04	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	7.66	0.584	79	0.5 U	0.5 U	6.62	193	0.01 U	0.617	0.0119
MW08		BTEX	07/09/08	Jul-08	18.9	151	3.42	6.86	27.4	0.569 J	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	3.27	1.92	28	ND	ND	43.5	142	ND	0.26	0.0702
MW08		BTEX	10/03/08	Oct-08	19.85	168	1.23	5.38	44.5	0.363 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1 U	1.82	15.9	25 U	1.46 J	25 J	32.9	0.0211	0.649	0.252
MW08		BTEX	01/06/09	Jan-09	20.21	190	9.25	6.59	3.37	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	7.54	0.262	93.4	5 U	5 U	2.92 J	180	0.01 U	0.696	0.0103
MW08		BTEX	04/07/09	Apr-09	19.9	311	9.03	6.67	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.64	0.05 U	71.5	5 U	5 U	5 U	201	0.0093 J	0.31	0.01 U
MW08		BTEX	07/24/09	Jul-09	18.92	96	4.36	6.29	2.02	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.11	0.581	33.2	5 U	5 U	6.74	134	0.0084 J	0.994	0.0156
MW08		BTEX	10/16/09	Oct-09	19.78	107	4.38	6.4	2.57	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	8.5	3.8	42.4	5 U	5 U	12.4	171	0.087	1.72	0.0226
MW08		BTEX	04/05/10	Apr-10	17.14	181	5.28	6.55	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	8.84	0.187	43.4	5 U	5 U	1.25 J	225	0.01 U	0.618	0.01 U
MW09			01/01/91*	Jan-91					190				ND	ND														
MW09			1/1/1992*	Jan-92					200				ND	ND														
MW09			01/01/99*	Jan-99					12				ND	ND														
MW09			01/01/00*	Jan-00					0.6				ND	ND														
MW09			03/02/06	Mar-06	18.25	249.2	5.00	4.19	1.19	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U										
MW09			11/01/07	Nov-07	18.8	421	4.01	4.42											0.922 J	7.52	37.4	0.5 U	0.5 U	0.347 J	5.03 J	0.01 U	0.52	0.0361
MW09			01/22/08	Jan-08	18.55	196.8	7.02	4.59	0.717 J	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	U	0	9.19	0.5 U	0.5 U	0.5 U	U	0.01 U	0.858	0.0348
MW09			04/08/08	Apr-08	17.97	261.9	0.88	5.35	0.253 J	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.61	5.9	10.6	0.5 U	0.5 U	0.5 U	12	0.01 U	1.67	0.0231
MW09			07/10/08	Jul-08	16.77	345	3.56	4.56	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	3.08	7.96	9.04	ND	ND	ND	21.3	0.00841 J	0.429	0.0247
MW09			10/07/08	Oct-08	17.85	397	10.42	3.38	0.626 L	1 UL	1 UL	1 UL	1 UL	0.4 UL	1 UL	2 U	1 UL	1 UL	3.74	7.09	6.15	5 U	0.632 J	239	9.54 J	0.01 U	0.323	0.0288
MW09			01/09/09	Jan-09	18.25	262	5.5	5.05	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.61	5.08	9.5	5 U	5 U	5 U	45	0.01 U	1.72	0.0258
MW09			04/13/09	Apr-09	17.64	350	6.62	4.07	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.27	6	10.1	5 U	5 U	5 U	5.23 J	0.01 U	0.238	0.026

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)
MW09			07/28/09	Jul-09	16.33	178	2.67	4.23	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	9.19	8.94	8.26	5 U	5 U	9.15	17.8	0.01 U	0.43	0.0272
MW09			10/16/09	Oct-09	17.61	355	1.53	4.47	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	4.38	5.46	9.24	5 U	5 U	5 U	U	0.01 U	0.214	0.0164
MW09			04/08/10	Apr-10	15.11	227	1.99	4.95	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.07	3.51	9.56	5 U	5 U	10	20.8	0.0412	0.269	0.0069 J
MW10		BTEX	1/1/1992*	Jan-92					42				ND	2200														
MW10		BTEX	01/01/99*	Jan-99					50				ND	4700														
MW10		BTEX	01/01/00*	Jan-00					6.8				ND	20000														
MW10		BTEX	03/01/06	Mar-06	19.22	24.3	0.23	5.68	200 U	200 U	200 U	200 U	200 U	6030	2050	8880	3970	37800										
MW10		BTEX	11/09/07	Nov-07	20.23	2	22.57	10.59											20.6	0.17 J	10.2	1.1	1.31	319	65.5	0.0527	4.07	0.0218
MW10		BTEX	04/04/08	Apr-08	19.65	94	5.87	9.71	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1010	105	924	810	4850	14	0.168	7.66	0.803 J	1 U	290	42.7	0.01 U	0.427	0.0061 J
MW10		BTEX	07/09/08	Jul-08	18.25	-107	0.44	7.63	10 U	10 U	10 U	10 U	10 U	4360	976	7090	3510	25800	29	0 ND	5.47	7.97	2.46	1200	266	0.0404	12.4	0.358
MW10		BTEX	10/03/08	Oct-08	19.68	-132	6.33	8.02	100 U	100 U	100 U	100 U	100 U	908	270	2760	1530	5920	31.4	0.16	5 U	5 U	0.917 J	1410 J	180	0.01 U	3.85	0.108
MW10		BTEX	01/07/09	Jan-09	19.5	41	3.81	7.73	5 U	5 U	5 U	5 U	5 U	107	46.8	436	281	611	5.42	0.083	5 U	5 U	5 U	75.9	75.8	0.0825	2.1	0.0412
MW10		BTEX	04/13/09	Apr-09	19.56	-113	0	5.92	2.5 J	5 U	5 U	5 U	5 U	1670	196	1360	991	9760	20.1	0.093	2.74 J	1.44 J	5 U	402	155	0.01 U	9.82	0.17
MW10		BTEX	07/29/09	Jul-09	18.55	-40		10.96	50 U	50 U	50 U	50 U	50 U	2940	1270	5750	2860	20700	18.5	0.978	8.57	5 U	1.36 J	136	1130	0.01 U	1.13	0.02 U
MW10		BTEX	10/15/09	Oct-09	17.39	14	>19.99	10.97	5 U	5 U	5 U	5 U	5 U	211	47.2	293	203	792	17.6	0.213	5 U	5 U	5 U	123	35.2	0.0437	10.1	0.0596
MW10		BTEX	04/05/10	Apr-10	15.54	-82	2.91	6.41	5 U	5 U	5 U	5 U	5 U	4690	1780	9100	4060	35100	35.3	0.105	5 U	5.78	5 U	3420	228	0.0058 J	28.7	0.477
MW11	2	3	1/1/1992*	Jan-92					1100				ND	ND														
MW11	2	3	01/01/99*	Jan-99					1500				1	0.4														
MW11	2	3	01/01/00*	Jan-00					1400				0.9	0.3														
MW11	2	3	03/01/06	Mar-06	19.18	320.4	1.49	4.46	624	28.8	1 U	1 U	0.505 J	0.163 J	1 U	2 U	1 U	1 U	5.97	1.58	3.98		0.5 U	0.694				
MW11	2	3	06/28/06	Jun-06	19.37	42.6	1.9	5.14	545	22.3	1 U	1 U	1 U	0.149 J	1 U	2 U	1 U	0.287 J	5090	1.12	55.9		0.5 U	0.5 U				
MW11	2	3	08/30/06	Aug-06	19.35	-8.8	0.31	5.1	209	8.41	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	15800	15 U	58.2		0.5 U	9.08				
MW11	2	3	10/09/06	Oct-06	19.03	5.37	0.75	4.96	378	15.2	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	10400	0.728 J	41.3		0.5 U	21.9				
MW11	2	3	10/23/07	Nov-07	19.65	-53	-0.04	5.43	32.1	3.12 J	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	2760	0.6 U	24.8	24	1.91	422	1240	0.0277	140	0.211
MW11	2	3	01/22/08	Jan-08	19.36	-35	0.16	5.28	145	9.95	1 U	1.14	1 U	0.237 J	1 U	2 U	1 U	0.266 J	2540	0	5 U	50 U	50 U	4310	284	0.0336	177	0.281
MW11	2	3	03/26/08	Apr-08	19.02	1.9	0.3	4.89	67.9	6.26	2 U	0.71 J	2 U	0.439 J	2 U	4 U	2 U	2 U	1960	1.51	20 U	4.4	4.07	357	1710	0.0769	186	0.273
MW11	2	3	06/19/08	Jul-08	18	-47	0	6.46	77.5	35.1	2 U	1.14 J	2 U	0.663 J	2 U	4 U	2 U	2 U	1410	0.05 ND	ND	0.662	0.857	ND	1880	0.062	115	0.133
MW11	2	3	10/06/08	Oct-08	18.53	-45	2.37	6.76	14.8 J	152 J	2.7 J	3.07 J	1 R	0.4 R	1 R	2 U	1 U	0.306 J	972	0.05 U	5 U	5 U	5 U	3.73 J	2250	0.0763	16.5	0.0368
MW11	2	3	01/12/09	Jan-09	18.78	-119	0	9.26	9.81	140	0.359 J	4.92	1 U	0.355 J	1 U	2 U	1 U	0.288 J	656	0.278	25 U	5 U	5 U	7280	1690	0.097	31.3	0.0631
MW11	2	3	04/07/09	Apr-09	18.6	-106	0.38	6.48	4.3 J	123	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	428	0.129	5 U	5 U	5 U	8590	1720	0.0802	32.7	0.0607
MW11	2	3	07/28/09	Jul-09	17.79	-187	0.65	6.25	1.2	86.9	0.372 J	2.68	1 U	0.549	1 U	2 U	1 U	1 U	347	0.152	5 U	5 U	5 U	6670	1730	0.0627	102	0.121
MW11	2	3	10/16/09	Oct-09	18.07	-177	0	7.39	0.625 J	137	0.639 J	16.9	1 U	0.645	1 U	2 U	1 U	0.362 J	249	0.03 J	9.62	500 U	500 U	19500	1130	0.142	129	0.13
MW11	2	3	04/09/10	Apr-10	16.4	-169	0	7.71	1 U	154	0.681 J	7.11	1 U	0.341 J	1 U	2 U	1 U	1 U	191	0.416	5 U	5 U	5 U	4750	938	0.0973	113	0.102
MW12		5	1/1/1992*	Jan-92					5800				ND	7														
MW12		5	01/01/99*	Jan-99					2500				ND	ND														
MW12		5	01/01/00*	Jan-00					450				ND	0.5														
MW12		5	03/02/06	Mar-06	19.98	310.6	5.46	4.76	1180	7.61	1 U	1 U	1 U	0.202 J	1 U	2 U	1 U	1 U										
MW12		5	10/22/07	Nov-07	20.17	306	2.96	5.12											1 U	1.14	0.523 J	0.5 U	0.5 U	0.5 U	13.8	0.01 U	0.0253 J	0.0413
MW12		5	01/22/08	Jan-08	20.06	156	2.84	5.16	505	2.11	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.56	0	10 U	0.5 U	0.5 U	0.5 U	26.1	0.01 U	0.0884 J	0.0374
MW12		5	03/25/08	Apr-08	19.52	221.6	1.63	5.38	505	2.68 J	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	4.68	0.97	4 J	0.5 U	0.5 U	0.524	30.1	0.01 U	0.38	0.0467
MW12		5	06/11/08	Jul-08	17.71	97	0.77	5.38	457	2.56	2.5 U	2.5 U	2.5 U	1 U	2.5 U	5 U	2.5 U	2.5 U	7.81	1.06	13.9	ND	ND	0.83	42.2	0.006 J	0.228	0.0412
MW12		5	10/03/08	Oct-08	19.18	92	3.74	6.26	82.9	5 U	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	22.5	3.59	63.3	5 U	1.42 J	154	73	0.01 U	0.291	0.0129
MW12		5	01/08/09	Jan-09	19.8	63	2.34	5.2	237	2.32	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1 U	0.523	5.45	5 U	5 U	5.7	56.5	0.01 U	4.86	0.0373
MW12		5	04/14/09	Apr-09	19.35	66	0.76	6	186	12.7	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6.86	1.5	9.94	5 U	5 U	5 U	64.3	0.01 U	0.951	0.0213

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)
MW12		5	07/29/09	Jul-09	18.21	181	0.28	4.93	233	50.8	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.78	0.559	5 U	5 U	5 U	5 U	8.6 J	0.01 U	1.55	0.0466
MW12		5	10/13/09	Oct-09	18.61	125	3.53	5.38	182	50.2	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	10.6	0.839	20.1	5 U	5 U	11.8	48.2	0.01 U	1.88	0.0336
MW12		5	04/08/10	Apr-10	15.6	111	3.51	6.51	64.1	23.4	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6.7	1.69	12	5 U	5 U	6.97	65.6	0.0053 J	0.164	0.0183
MW13	1		1/1/1992*	Jan-92					240				ND	ND														
MW13	1		01/01/99*	Jan-99					1100				ND	ND														
MW13	1		01/01/00*	Jan-00					890				ND	ND														
MW13	1		02/28/06	Mar-06	15.9	301.9	2.76	4.55	687	47.1	0.477 J	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	4.06	7.29	3.19		0.5 U	0.5 U				
MW13	1		06/28/06	Jun-06	16.44	83.67	0.11	5.31	275	20.9	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	295	0.114 J	9.24		0.5 U	0.5 U				
MW13	1		08/30/06	Aug-06	16.68	-152.6	1.61	5.7	560	45.7	0.461 J	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1710	0.154 J	15.2		0.5 U	1.03				
MW13	1		10/11/06	Oct-06	16.25	-118.1	2.46	5.82	232	227	2 U	2 U	2 U	0.8 U	2 U	4 U	2 U	2 U	2390	2.4 U	6.48		0.684	19				
MW13	1		10/23/07	Nov-07	17.45	-60	0	6.23	1.15 J	197	2 U	6.79	2 U	0.8 U	2 U	4 U	2 U	2 U	330	0.6 U	1 U	0.5 U	0.5 U	8410	900	0.0489	28.8	0.0246
MW13	1		01/23/08	Jan-08	17.34	-77	0.11	6.32	0.411 J	162	1 U	3.15	1 U	0.345 J	1 U	2 U	1 U	1 U	106	0	5 U	0.5 U	0.5 U	0.5 U	867	0.0695	90.6	0.0678
MW13	1		03/24/08	Apr-08	16.65	-70	0.02	6.26	0.512 J	153	1 U	2.23	1 U	0.216 J	1 U	2 U	1 U	1 U	92.5	0.365	20 U	25 U	25 U	13900	1020	0.0646	122	0.0923
MW13	1		06/11/08	Jul-08	14.86	-84.1	0.46	6.12	1.06	155	1 U	1.73	1 U	0.282 J	1 U	2 U	1 U	1 U	39.5	0.511	ND	ND	ND	25200	4550	0.0278	161	0.117
MW13	1		10/03/08	Oct-08	16.51	-144	0	7.21	0.382 J	162	1 U	1.9	1 U	0.233 J	1 U	2 U	1 U	1 U	49.9	0.538	16.3	5 U	5 U	20.2	689 J	0.0147	138	0.122
MW13	1		01/07/09	Jan-09	16.57	-131	0	9.69	0.304 J	137	1 U	0.964 J	1 U	0.251 J	1 U	2 U	1 U	1 U	40.4	0.488	5 U	5 U	5 U	7490	805	0.01 U	103	0.114
MW13	1		04/09/09	Apr-09	16.65	-108	1.56	6.36	0.277 J	121	1 U	0.679 J	1 U	0.229 J	1 U	2 U	1 U	1 U	32.3	0.46	5 U	5 U	5 U	12000	865	0.0606	58.1	0.0972
MW13	1		07/22/09	Jul-09	15.51	-158	3.52	6.58	0.333 J	126	1 U	0.984 J	1 U	0.225 J	1 U	2 U	1 U	1 U	17.8	0.432	5 U	5 U	5 U	6660	860	0.0099 J	105	0.114
MW13	1		10/13/09	Oct-09	15.81	-202	0	6.87	0.447 J	100	1 U	0.922 J	1 U	0.169 J	1 U	2 U	1 U	1 U	48.5	0.141	5 U	5 U	5 U	14300	858	0.0105	85.9	0.0928
MW13	1		04/09/10	Apr-10	13.16	-63	7.8	8.17	1 U	70.2	1 U	0.512 J	1 U	0.4 U	1 U	2 U	1 U	1 U	25.9	0.13	5 U	100 U	100 U	5290	663	0.108	80.4	0.0824
MW14			1/1/1992*	Jan-92					3				ND	57														
MW14-SS22			01/12/09	Jan-09	8.16	222		4.72	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U										
MW15	1		01/01/00*	Jan-00					370				ND	1														
MW15	1		02/28/06	Mar-06	16.02	248.4	5.13	4.91	241	14.2	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.97	1.38	12.9		0.5 U	0.5 U				
MW15	1		06/28/06	Jun-06	16.64	4.57	0.23	5.34	233	12.7	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	282	0.6 U	4.4		0.574	2.25				
MW15	1		08/30/06	Aug-06	16.78	-79.4	0.48	5.45	243	12.8	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1350	15 U	25 U		0.783	5.25				
MW15	1		10/10/06	Oct-06	16.39	-105.07	0.42	5.68	265	14.9	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3460	2.4 U	5.22		1.56	171				
MW15	1		10/23/07	Nov-07	17.72	-95	0.03	6.45	3	190	2 U	2 U	2 U	0.8 U	2 U	4 U	2 U	2 U	2040	0.143 J	1 U	0.5 U	1.09	9460	429	0.01 U	353	0.935
MW15	1		01/23/08	Jan-08	18.45	-110	0.85	6.6	0.814 J	156	1 U	0.416 J	1 U	0.4 U	1 U	2 U	1 U	1 U	1400	1.8 U	5 U	0.5 U	0.456 J	0.5 U	598	0.01 U	244	0.735
MW15	1		03/24/08	Apr-08	17.49	-138	0	6.72	0.52 J	162	1 U	0.513 J	1 U	0.4 U	1 U	2 U	1 U	1 U	801	0.366	20 U	0.5 U	0.492 J	19100	2250	0.0076 J	195	0.559
MW15	1		06/18/08	Jul-08	15.04	-140	0	7.12	0.411 J	137	1 U	0.587 J	1 U	0.4 U	1 U	2 U	1 U	1 U	224	0.268	21.7	ND	1.4	ND	1940	0.0106	90.6	0.269
MW15	1		10/03/08	Oct-08	16.65	-179	0	7.25	0.422 J	126	1 U	1 U	1 U	3.13	1 U	2 U	1 U	1 U	58.1	0.374	5 U	5 U	5 U	22.8	1890	0.01 U	57.1	0.116
MW15	1		01/07/09	Jan-09	17.41	-164	0	10.13	0.421 J	96.9	1 U	1 U	1 U	0.384 J	1 U	2 U	1 U	1 U	19.3	0.092	5 U	5 U	0.577 J	8180	1310	0.01 U	31.3	0.0661
MW15	1		04/09/09	Apr-09	16.7	-128	0.51	6.86	0.351 J	63.6	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	19.1	0.105	5 U	5 U	5 U	11900	1190	0.01 U	8.28	0.0437
MW15	1		07/23/09	Jul-09	15.56	-202	0.07	7.06	0.329 J	79.5	1 U	0.359 J	1 U	0.272 J	1 U	2 U	1 U	1 U	7.04	0.163	5 U	5 U	5 U	6010	1290	0.0058 J	20.5	0.0421
MW15	1		10/13/09	Oct-09	15.96	-166	0	7.4	0.462 J	83.8	1 U	0.463 J	1 U	0.368 J	1 U	2 U	1 U	1 U	49.4	0.034 J	8.98	5 U	5 U	17200	1190	0.01 U	22.1	0.0283
MW15	1		04/06/10	Apr-10	13.14	-25	0.44	7.36	0.707 J	88.8	1 U	0.735 J	1 U	0.369 J	1 U	2 U	1 U	1 U	23.5	0.041 J	5 U	5 U	5 U	10600	1000	0.01 U	5.31	0.0211
MW16		2	01/01/00*	Jan-00					69				ND	1.3														
MW16		2	03/01/06	Mar-06	14.91	509.3	0.76	4.66	64.8	15.6	1 U	0.432 J	1 U	0.531	1 U	2 U	1 U	1 U										
MW16		2	11/08/07	Nov-07	16.15	390	0.32	3.62											1.55	1.21	9.06	0.5 U	0.445 J	293	5.28 J	0.01 U	0.0393 J	1.51
MW16		2	01/01/08*	Jan-08					27.5	11.8	1 U	1 U	1 U	0.321 J	1 U	2 U	1 U	1 U	1.1	0	5 U	0.5 U	0.5 U	0.5 U	6.66 J	0.01 U	0.216	0.811
MW16		2	03/26/08	Apr-08	15.23	340.6	0.79	4.45	88.3	27.2	1 U	0.674 J	1 U	0.804	1 U	2 U	1 U	1 U	3.27	1.17	5 U	0.5 U	0.5 U	0.5 U	15.2	0.01 U	0.368	0.72
MW16		2	06/16/08	Jul-08	13.8	160	0.08	4.92	86.5	27	1 U	0.743 J	1 U	0.839	1 U	2 U	1 U	1 U	3.3	1.8	9.78	ND	ND	3.83	23.5	ND	0.646	1.38
MW16		2	10/03/08	Oct-08	15.14	339	0	4.27	68.8	22.2	1 U	0.887 J	1 U	0.611	1 U	2 U	1 U	1 U	7.94	1.72	7.62	5 U	5 U	19.7	13.7	0.01 U	0.129	1.44

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)	
MW16		2	01/09/09	Jan-09	15.22	288	0	3.38	59.7	19	1 U	0.388 J	1 U	0.42	1 U	2 U	1 U	1 U	2.82	1.21	6.33	5 U	5 U	0.511 J	51	0.01 U	0.404	1.93	
MW16		2	04/07/09	Apr-09	15.07	277	0	4.18	75.4	22.8	1 U	0.318 J	1 U	0.447	1 U	2 U	1 U	1 U	3.83	1.3	7.79	5 U	5 U	5 U	5.78 J	0.01 U	0.0948 J	1.51	
MW16		2	07/23/09	Jul-09	14.57	210	0.26	4.58	67.3	24.1	1 U	0.722 J	1 U	0.746	1 U	2 U	1 U	1 U	1 U	3.96	26.5	5 U	5 U	171	46.1	0.007 J	0.0401 J	1.7	
MW16		2	10/12/09	Oct-09	14.93	313	0	4.68	65.2	20.6	1 U	0.624 J	1 U	0.453	1 U	2 U	1 U	1 U	8.53	1.86	19.2	5 U	5 U	312	9.44 J	0.01 U	0.0482 J	1.85	
MW16		2	04/07/10	Apr-10	12.08	-15	0	5.81	4.57	1.56	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	14.6	0.05 U	19.8	5 U	5 U	2180	68.4	0.01 U	124	4	
MW17		1	01/01/00*	Jan-00					1600				ND	27															
MW17		1	03/02/06	Mar-06	13.35	249.7	0.59	4.89	1240	236	1.48	2.25 J	1 U	7.74	0.39 J	1.33 J	0.294 J	0.26 J											
MW17		1	11/06/07	Nov-07	14.9	206.7	0.96	4.78											1 U	0.6 U	2.3	0.5 U	1.15	546	19.7	0.01 U	0.369	0.0094 J	
MW17		1	01/01/08*	Jan-08					1380	215	1.54	2.8	1 U	7.29	0.515 J	1.33 J	0.256 J	1 U	42.6	0	5 U	0.5 U	1.03	558	109	0.01 U	17.5	0.0247	
MW17		1	03/27/08	Apr-08	14.12	33	0.13	5.59	1150	229	10 U	10 U	10 U	5.91	10 U	20 U	10 U	10 U	110	0.975	5 U	1 U	1.2	362	214	0.0145	56.4	0.0638	
MW17		1	06/10/08	Jul-08	12.02	0.8	0.35	5.87	402	1230	10 U	10 U	10 U	5.57	10 U	20 U	10 U	10 U	493	0.436	ND	ND	1.55	491	868	0.0245	133	0.117	
MW17		1	09/30/08	Oct-08	13.95	-126	0	6.49	10 U	18.7	10 U	10 U	10 U	124	61.5	20 U	10 U	33.3	1 U	0.161	5 U	5 U	1.4 J	271	439	0.01 U	171	0.157	
MW17		1	01/08/09	Jan-09	14.43	-119	0	9.16	5 U	2260	4.04 J	1.66 J	5 U	5.52	5 U	10 U	5 U	5 U	351	0.39	5 U	5 U	0.628 J	2770	868	0.01 U	197	0.185	
MW17		1	04/14/09	Apr-09	15.05	-131	0	6.09	2.68	1580	5.43	3.26	1 U	5.65	1 U	2 U	0.387 J	1 U	333	0.698	5 U	5 U	5 U	13600	742	0.0849	225	0.214	
MW17		1	07/24/09	Jul-09	13.36	-197	0.07	6.6	10 U	1540	3.49 J	2.7 J	10 U	5.5	10 U	20 U	10 U	10 U	63.1	0.172	25 U	5 U	5 U	12700	694	0.148	199	0.198	
MW17		1	10/13/09	Oct-09	13.82	-196	0.61	6.8	20 U	1380	20 U	20 U	20 U	8 U	20 U	40 U	20 U	20 U	59.8	0.325	6.48	5 U	5 U	16100	587	0.0364	131	0.101	
MW17		1	04/09/10	Apr-10	10.1	-150	0	6.72	10 U	1010	10 U	10 U	10 U	2.8 J	10 U	20 U	10 U	10 U	27.2	0.269	5 U	5 U	5 U	4450	278	0.0147	65.4	0.0541	
MW18			01/01/00*	Jan-00					ND				ND	ND															
MW18			03/02/06	Mar-06	9.77	516.3	1.59	4.62	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW18			11/06/07	Nov-07	13.6	234.2	0.43	4.71											2.48	1.29	1.58	0.5 U	0.34 J	16.2	16.7	0.01 U	0.17	0.0079 J	
MW18			03/27/08	Apr-08	11.42	279.4	1.09	4.74	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.96	1.27	5 U	0.5 U	0.5 U	0.251 J	6.25 J	0.01 U	1.28	0.01 U	
MW18			07/09/08	Jul-08	10.2	291	1.54	4.81	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	2.96	1.17	ND	ND	ND	3.06	27.9	ND	1	0.00797 J	
MW18			09/30/08	Oct-08	12.72	303	0	2.48	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	4.29	1.15	5 U	5 U	5 U	3.36 J	16.1	0.01 U	0.172	0.0074 J	
MW19		5	01/01/00*	Jan-00					390				ND	1															
MW19		5	03/02/06	Mar-06	21.61	394.1	5.94	4.55	2610	15.4	0.354 J	1 U	0.47 J	0.567	1 U	2 U	1 U	1 U											
MW19		5	10/22/07	Nov-07	20.58	351	0.61	4.97											1 U	1.06	4.8	0.5 U	0.5 U	0.517	8.68 J	0.01 U	0.332	0.0348	
MW19		5	01/22/08	Jan-08	20.1	-29.8	5.61	5.03	2580	11.4	0.294 J	1 U	0.383 J	0.645	1 U	2 U	1 U	1 U	380	0	15 U	0.5 U	0.285 J	1.03	207	0.01 U	9.97	0.107	
MW19		5	03/25/08	Apr-08	19.95	-38	0	5.1	1880	15	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	1160	0.335	20 U	0.287 J	1.12	4.61	599	0.0389	15.5	0.148	
MW19		5	06/11/08	Jul-08	19.45	-42	0	5.85	1960	21.4	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	2240	0.171	ND	ND	0.929	10.7	2330	0.065	39.7	0.243	
MW19		5	10/03/08	Oct-08	19.45	-49	5.06	5.96	1170	9.43 J	20 U	20 U	20 U	8 U	20 U	40 U	20 U	20 U	1630	0.414	50 U	5 U	5 U	0.725 J	1850	0.0206	88.3	0.258	
MW19		5	01/08/09	Jan-09	20.3	-92	0	5.92	412	1420	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	2410	0.117	5 U	5 U	0.782 J	2380	4020	0.02 U	209	0.379	
MW19		5	04/14/09	Apr-09	19.8	-136	0.45	6.15	8.25 J	987	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	2360	0.391	9.31	5 U	5 U	8400	2980	0.0153	259	0.31	
MW19		5	07/29/09	Jul-09	19.41	-142	0	6.4	2.93 J	1230	5 U	5 U	5 U	0.905 J	5 U	10 U	5 U	5 U	1640	0.299	25 U	5 U	5 U	7610	139	0.02 U	285	0.271	
MW19		5	10/13/09	Oct-09	19.45	-128	0	6.74	3.38 J	1260	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	2940	0.05 U	16.5	5 U	5 U	16900	4390	0.02 U	394	0.318	
MW19		5	04/08/10	Apr-10	16.25	-185	2.36	7.65	10 U	1140	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	1650	0.582	5 U	5 U	5 U	19500	2210	0.01 U	145	0.121	
MW20			01/01/00*	Jan-00					ND				ND	9.9															
MW20			03/08/06	Mar-06	10.61	377.9	2.49	4.36	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW20			11/06/07	Nov-07	14.02	369	0.25	4.02											1 U	0.74	9.54	0.5 U	0.5 U	0.279 J	9.87 J	0.01 U	0.388	0.0471	
MW20			03/27/08	Apr-08	11.56	168	1.4	4.19	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.4	2.87	5 U	0.5 U	0.5 U	0.5 U	10 U	0.01 U	0.525	0.0239	
MW20			07/10/08	Jul-08	10.5	319	1.53	4.62	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	2.83	0.72	ND	ND	ND	0.458 J	29.8	ND	0.89	0.0284	
MW20			10/02/08	Oct-08	13.05	274	0	4.05	1 U	1 UL	1 UL	1 U	1 UL	0.132 L	1 UL	2 U	1 U	1 UL	6.92	0.616	5 U	5 U	5 U	3.82 J	U	0.01 U	0.756	0.0358	
MW21			01/01/00*	Jan-00					ND				ND	ND															
MW21			03/01/06	Mar-06	15.98	430.2	3.03	4.53	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW21			11/08/07	Nov-07	19	422	2.35	3.89											0.791 J	3.49	1.44	0.5 U	0.5 U	0.756	9.43 J	0.01 U	0.277	0.0067 J	

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)	
MW21			07/10/08	Jul-08	16.11	320	3.68	4.72	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	2.17	3.36	ND	ND	ND	ND	17.1	ND	4.33	0.00987 J	
MW22			01/01/00*	Jan-00					15				33	ND															
MW22			07/15/08	Jul-08	16.51	191	0.04	4.29	0.758 J	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	7.59	0 ND	3.82 J	NS	NS	NS	14.5	0.00685 J	13.2	0.0145	
MW22			10/08/08	Oct-08	17.48	208	0	3.94	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	9.3	0.142	5 U	5 U	0.269 J	0.95 J	22.2	0.01 U	14.2	0.0065 J	
MW22			01/12/09	Jan-09	17.72	213	0	4.1	0.334 J	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	13.6	0.126	3.41 J	5 U	5 U	16.3	17	0.0051 J	13	0.0077 J	
MW22			04/08/09	Apr-09	17.52	143	3.33	5.17	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	15.7	0.358	29.9	5 U	5 U	2.92 J	65.4	0.0097 J	4.66	0.0185	
MW22			07/27/09	Jul-09	16.42	136	0	4.52	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	26.7	0.112	3.93 J	5 U	5 U	19.7	30.4	0.01 U	14.6	0.0284	
MW22			10/14/09	Oct-09	16.82	225	0	4.81	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	24.9	0.03 J	57.5	5 U	5 U	13.4	12.2	0.01 U	7.45	0.0097 J	
MW22			04/07/10	Apr-10	14.21	58		5.83	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	18.6	0.359	4.53 J	5 U	5 U	9.61	63.8	0.01 U	5.4	0.197	
MW23		6	01/01/00*	Jan-00					71				75	ND															
MW23		6	03/02/06	Mar-06	19.93	299.9	6.26	4.97	37.2	12.9	1 U	1 U	29	0.4 U	1 U	2 U	1 U	0.351 J											
MW23		6	10/22/07	Nov-07	21.98	196	1.44	5.18											1330	1.59	27.3	0.5 U	0.5 U	0.5 U	532	0.0348	2.81	0.364	
MW23		6	01/22/08	Jan-08	14.57	-314.7	0.85	5.27	138	29	0.393 J	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	856	0	15 U	0.5 U	0.552	0.355 J	279	0.01 U	19.6	0.353	
MW23		6	03/25/08	Apr-08	21.28	-169.9	0.89	5.77	55.5	24.1	0.462 J	0.341 J	1 U	0.4 U	1 U	2 U	1 U	1 U	1290	0.207	20 U	0.5 U	1.25	0.868	1910	0.0081 J	44.9	0.545	
MW23		6	06/10/08	Jul-08	19.55	42.5	0.2	4.72	46.8	23.7	1 U	0.531 J	1 U	0.4 U	1 U	2 U	1 U	1 U	1830	0.252	2.82 J	ND	1.71	2.76	2500	0.0109	92.7	0.976	
MW23		6	10/02/08	Oct-08	21.05	-125	0	6.15	58.2	26.8	1 U	0.621 J	1 U	0.4 U	1 U	2 U	1 U	1 U	1540	0.264	5 U	5 U	5 U	0.321 J	275	0.02 U	141	1.29	
MW23		6	01/07/09	Jan-09	21.44	-122	0	6.01	42.4	24.9	0.261 J	1.15	1 U	0.4 U	1 U	2 U	1 U	1 U	1280	0.177	5 U	5 U	0.552 J	1280	2350	0.03 U	336	1.74	
MW23		6	04/09/09	Apr-09	21.32	-136	0	6.13	0.483 J	50.3	0.289 J	0.26 J	1 U	0.4 U	1 U	2 U	1 U	1 U	1230	4.81	11.6	5 U	500 U	5 U	2210	0.0421	292	1.34	
MW23		6	07/23/09	Jul-09	20.11	-209	0.05	6.76	4.63	35.3	0.269 J	0.358 J	1 U	0.4 U	1 U	2 U	1 U	1 U	977	0.475	5 U	5 U	5 U	8280	2110	0.0092 J	272	1.23	
MW23		6	10/14/09	Oct-09	20.61	-191	0	7.24	0.487 J	33.7	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	947	0.665	24.3	5 U	5 U	5 U	290	0.01 U	172	0.973	
MW23		6	04/07/10	Apr-10	17.51	-208	0	7.59	0.523 J	22	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	368	0.05 U	5 U	5 U	5 U	16800	1580	0.01 U	35.9	0.36	
MW24		6	01/01/00*	Jan-00					72				41	ND															
MW24		6	03/02/06	Mar-06	20.07	336.4	1.39	4.69	64.1	37.1	0.266 J	0.602 J	14.5	0.4 U	1 U	2 U	1 U	1 U											
MW24		6	10/22/07	Nov-07	22.12	414	0.91	4.67											0.991 J	2.41	1.03	0.5 U	0.5 U	0.5 U	8.18 J	0.01 U	0.1 U	0.0738	
MW24		6	01/22/08	Jan-08	15.73	27	0.64	5.53	31.8	15.8	1 U	1 U	8.73	0.4 U	1 U	2 U	1 U	1 U	11.9	0	5 U	0.5 U	0.5 U	0.423 J	51.7	0.01 U	11.3	0.125	
MW24		6	03/25/08	Apr-08	21.36	53	0.1	5.44	29.4	14.9	1 U	0.417 J	5.25	0.4 U	1 U	2 U	1 U	1 U	12.7	0.34	10.2	0.5 U	0.5 U	0.961	83.1	0.0097 J	26.2	0.117	
MW24		6	06/09/08	Jul-08	19.61	89.7	0.73	5.51	35.1	20.7	1 U	0.596 J	16.2	0.4 U	1 U	2 U	1 U	1 U	8.22	0.311	ND	ND	ND	13.2	59.9	0.0123	18.1	0.112	
MW24		6	10/02/08	Oct-08	21.15	68	0	5.27	25.2 L	12.1 L	0.264 L	0.39 L	17.4 L	0.4 UL	1 UL	2 UL	1 UL	1 UL	2.99	0.988	5 U	5 U	5 U	0.427 J	21.1	0.01 U	9.65	0.0809	
MW24		6	01/07/09	Jan-09	21.52	-50	0	5.65	26.6	14.9	1 U	0.74 J	4.26	0.4 U	1 U	2 U	1 U	1 U	32.2	0.05	5 U	5 U	5 U	2.63 J	122	0.0094 J	38.3	0.153	
MW24		6	04/09/09	Apr-09	21.4	-82	0	5.65	26.2	18.5	1 U	0.384 J	13.3	0.4 U	1 U	2 U	1 U	1 U	8.55	0.084	5 U	5 U	5 U	219	96.5	0.0166	40.7	0.123	
MW24		6	07/23/09	Jul-09	20.1	-108	0	6.03	22.7	28.8	1 U	0.669 J	7.26	0.4 U	1 U	2 U	1 U	1 U	30.2	0.24	5 U	5 U	5 U	155	143	0.0147	42.4	0.158	
MW24		6	10/14/09	Oct-09	20.64	-82	0	6.41	18.4	29.1	1 U	0.321 J	4.47	0.4 U	1 U	2 U	1 U	1 U	14.1	0.236	8.51	5 U	5 U	1480	101	0.0172	43.5	0.127	
MW24		6	04/06/10	Apr-10	17.51	92	0	5.28	9.3	10.7	1 U	1 U	14.5	0.4 U	1 U	2 U	1 U	1 U	2.76	0.05 U	5 U	5 U	5 U	112	21.6	0.01 U	7.22	0.0512	
MW25			01/01/00*	Jan-00					1.1				ND	ND															
MW25			02/28/06	Mar-06	22.36	273.6	1.71	4.58	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW25			10/24/07	Nov-07	24.09	424	0.66	4.01											1.29	1.24	19.3	0.5 U	0.5 U	11.1	17.6	0.01 U	0.157	0.167	
MW25			04/08/08	Apr-08	23.35	382.7	0.92	4.41	0.262 J	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.08	1.6	5 U	0.5 U	0.5 U	0.5 U	10.6	0.01 U	1.31	0.039	
MW25			07/10/08	Jul-08	22.11	210	0.57	4.65	1 U	1 U	1 U	1 U	1 U	0 m	1 U	2 U	1 U	1 U	7.27	1.38	ND	ND	ND	ND	24.5	ND	0.344	0.0266	
MW25			10/06/08	Oct-08	23.29	339	0.47	4.2	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	0.505 J	1 U	0.434 J	2.75	1.44	5 U	5 U	5 U	5.98	20	0.01 U	0.193	0.0348	
MW25			01/09/09	Jan-09	23.75	402	0.12	2.43	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.74	1.68	5 U	5 U	5 U	1.48 J	41.9	0.01 U	0.357	0.0436	
MW25			04/08/09	Apr-09	23.5	444	1.66	3.94	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.65	1.35	5 U	5 U	5 U	5 U	16.9	0.01 U	0.35	0.0416	
MW26			01/01/00*	Jan-00					ND				ND	ND															
MW26			03/01/06	Mar-06	19.02	34.2	0.05	5.82	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW26			10/25/07	Nov-07	20.44	76	0.07	5.31											1 U	0.6 U	48	0.5 U	0.5 U	6.67	77.8	0.01 U	22.5	0.702	

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)	
MW26			04/08/08	Apr-08	19.77	29.1	0.82	5.75	0.33 J	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.48	0.041 J	49.6	0.5 U	0.5 U	5.48	61.6	0.01 U	26.8	0.561	
MW26			07/10/08	Jul-08	18.75	19	0.71	5.74	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	5.45	0.305	55.6	ND	ND	6.69	84.7	ND	25.8	0.557	
MW26			10/06/08	Oct-08	19.68	9	3.64	6.3	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	11	0.647	43.6	5 U	5 U	4.86 J	76.5	0.01 U	33.7	0.658	
MW26			01/12/09	Jan-09	20.03	59	0	5.23	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.87	0.213	30.1	5 U	5 U	1.05 J	57.8	0.01 U	18	0.565	
MW26			04/08/09	Apr-09	19.82	40	0.38	5.32	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	4.96	0.308	32	5 U	5 U	1.94 J	61.7	0.006 J	30.1	0.635	
MW27			01/01/00*	Jan-00					2.5				20	ND															
MW27			03/02/06	Mar-06	19.92	406.5	1.29	4.29	5.31	2.35	1 U	1 U	3.72	0.4 U	1 U	2 U	1 U	1 U											
MW27			11/01/07	Nov-07	21.17	440	0.29	4.56											1.57	0.317 J	29.4	0.5 U	0.329 J	0.265 J	17.4	0.01 U	0.326	0.0824	
MW27			04/08/08	Apr-08	20.53	392.5	0.34	4.32	2.27	1.05	1 U	1 U	4.06	0.4 U	1 U	2 U	1 U	1 U	4.77	0.453	10.1	0.5 U	0.5 U	0.5 U	10 U	0.01 U	0.87	0.0728	
MW27			07/10/08	Jul-08	19.92	417	2.4	4.26	1.36	0.549 J	1 U	1 U	3.94	0 U	1 U	2 U	1 U	1 U	2.57	0.81	8.71	ND	ND	0.252 J	11	ND	1.03	0.084	
MW27			10/07/08	Oct-08	20.7	373	5.47	3.61	1.42 M	0.623 J	1 U	1 U	3.14 J	0.4 U	1 U	2 U	1 U	1 U	2.36	0.73	3.91 J	5 U	0.313 J	24.7	17.8	0.01 U	0.623	0.0734	
MW27			01/13/09	Jan-09	20.81	407	1.13	3.95	1.53	0.673 J	1 U	1 U	1.93	0.4 U	1 U	2 U	1 U	1 U	4.32	0.73	5.35	5 U	5 U	5 U	31.6	0.01 U	0.229	0.0666	
MW27			04/15/09	Apr-09	20.6	402	1.04	3.93	1.71	0.677 J	1 U	1 U	4.42	0.4 U	1 U	2 U	1 U	1 U	5.2	0.555	8.25	5 U	5 U	5 U	9.79 J	0.01 U	2.99	0.129	
MW27			07/23/09	Jul-09	20.05	241	1.52	4.22	2.09	0.956 J	1 U	1 U	2.1	0.4 U	1 U	2 U	1 U	1 U	1 U	0.778	5.52	5 U	5 U	5 U	17.6	0.01 U	0.138	0.0671	
MW27			10/16/09	Oct-09	20.21	386	0	4.23	2.88	1.44	1 U	1 U	3.89	0.4 U	1 U	2 U	1 U	1 U	4.75	2.98	6.16	5 U	5 U	5 U	U	0.01 U	1.53	0.0762	
MW27			04/07/10	Apr-10	18.56	328	0.92	3.8	4.29	1.66	1 U	1 U	1.66	0.4 U	1 U	2 U	1 U	1 U	1.09	1.07	5.18	5 U	5 U	7.95	7.59 J	0.01 U	0.439	0.0645	
MW28			01/01/00*	Jan-00					ND				ND	0.5															
MW29			01/01/00*	Jan-00					ND				ND	ND															
MW29			03/02/06	Mar-06	7.62	268.7	7.36	5.56	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW29			11/02/07	Nov-07	7.66	205	3.1	5.27											13.1	0.28 J	10.6	0.5 U	0.5 U	0.5 U	63.6	0.062	14.1	0.028	
MW29			04/09/08	Apr-08	13.18	408.7	2.18	4.27	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.3	0.417	49.2	0.5 U	0.5 U	0.5 U	22.1	0.01 U	0.544	0.119	
MW29			07/15/08	Jul-08	10.05	180	1.51	5.24	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	9.59	0.492	3.61 J	ND	ND	ND	51.9	0.0535	9.56	0.0224	
MW29			07/28/09	Jul-09	9.76	189	0.24	5.53	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	23.2	0.243	11.7	5 U	5 U	5 U	55.3	0.0748	6.89	0.0209	
MW29			10/14/09	Oct-09	10.51	166	1.73	5.53	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	21.9	0.279	15.7	5 U	5 U	5 U	22.5	0.0751	20.4	0.0219	
MW29			04/12/10	Apr-10	6.91	249	2.1	5.43	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	8.81	0.335	19.9	5 U	5 U	5 U	25	0.01 U	0.917	0.0206	
MW30			01/01/00*	Jan-00					ND				ND	0.9															
MW30			02/28/06	Mar-06	21.38	128.8	1.06	5.71	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW30			11/08/07	Nov-07	22.9	336	0.92	4.3											0.969 J	3.02	3.27	0.5 U	0.5 U	0.787	21.1	0.01 U	0.285	0.0212	
MW30			04/07/08	Apr-08	22.27	272.9	3.81	4.87	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.69	0.799	2.59 J	0.5 U	0.5 U	0.5 U	15.5	0.01 U	0.435	0.0357	
MW30			07/11/08	Jul-08	21.61	311	4.64	4.95	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	8.41	3.23	ND	ND	ND	ND	15.7	ND	0.387	0.0392	
MW30			10/07/08	Oct-08	22.23	339	2.87	4.7	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.17	3.04	5 U	5 U	1.02 J	249	18.9	0.01 U	0.0694 J	0.0456	
MW30			01/14/09	Jan-09	22.46	184	3.63	4.3	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.49	3.02	5 U	5 U	5 U	2.08 J	36.8	0.01 U	0.0845 J	0.0421	
MW30			04/08/09	Apr-09	22.27	268	3.13	4.46	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.98	2.32	3.44 J	5 U	5 U	5 U	15.1	0.01 U	0.188	0.0469	
MW30			07/29/09	Jul-09	21.71	214	4.87	4.86	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6.83	3	5 U	5 U	5 U	5 U	5.42 J	0.01 U	0.0386 J	0.0406	
MW30			10/12/09	Oct-09	21.91	326	3.99	4.73	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	7.42	3.08	5 U	5 U	5 U	5 U	11.8	0.01 U	0.1 U	0.0427	
MW30			04/05/10	Apr-10	19.84	356	8.91	5.13	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6.22	3.1	5.71	5 U	5 U	5 U	15.6	0.01 U	0.0842 J	0.0308	
MW31		BTEX	01/01/00*	Jan-00					39				ND	ND															
MW31		BTEX	02/27/06	Mar-06	19.35	420.2	3.80	4.35	0.579 J	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW31		BTEX	10/25/07	Nov-07	20.84	300	2.03	5.2											1 U	0.914 J	28.9	0.5 U	0.5 U	0.271 J	53.3	0.01 U	0.0394 J	0.0128	
MW31		BTEX	04/07/08	Apr-08	19.65	259.9	4.21	5.33	13.4	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.97	0.864	21.5	0.5 U	0.5 U	0.5 U	28.8	0.01 U	0.0552 J	0.03	
MW31		BTEX	07/10/08	Jul-08	19.63	388	5.02	5.04	0.607 J	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	3	1.21	16.1	ND	ND	ND	8.77 J	ND	0.0373 J	0.0571	
MW31		BTEX	10/07/08	Oct-08	20.35	221	2.39	5.35	9.16	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.29	1.18	20.8	0.85 J	1.06 J	556	41.6	0.01 U	0.0654 J	0.0194	
MW31		BTEX	01/09/09	Jan-09	19.84	237	4.17	5.16	9.97	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.15	1.07	22.9	5 U	5 U	0.316 J	58.6	0.01 U	0.137	0.0194	
MW31		BTEX	04/09/09	Apr-09	20.23	254	3.86	5.08	9.35	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.65	0.912	25	5 U	5 U	5 U	61	0.01 U	0.231	0.0176	

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)
MW31		BTEX	07/27/09	Jul-09	20.04	150	3.02	4.97	10.4	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6.88	0.711	18.6	5 U	5 U	5 U	41.3	0.01 U	0.1 U	0.029
MW31		BTEX	10/15/09	Oct-09	20.15	236	1.64	5.26	17.8	0.281 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.48	2.92	13.2	5 U	5 U	5 U	17.6	0.01 U	0.0661 J	0.0174
MW31		BTEX	04/09/10	Apr-10	18.41	222	5.5	4.39	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.23	0.987	27.3	5 U	5 U	5 U	11.6	0.0078 J	0.0273 J	0.0429
MW32			01/01/00*	Jan-00					160				22	ND														
MW32			03/01/06	Mar-06	19.72	294.4	1.17	4.53	165	4.16	1 U	1 U	7.06	0.4 U	1 U	2 U	1 U	1 U										
MW32			10/24/07	Nov-07	20.21	427	0.34	4.03											1.06	1.75	3.27	0.5 U	0.5 U	0.853	23.2	0.01 U	0.104	0.0405
MW32			01/01/08*	Jan-08					388	9.45	2.5 U	2.5 U	3.46	0.394 J	2.5 U	5 U	2.5 U	2.5 U	1.15	0	9.28	0.5 U	0.5 U	9.34	11.3	0.01 U	0.0271 J	0.126
MW32			03/25/08	Apr-08	17.78	179.2	6.59	5.67	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.07	0.341	13	0.5 U	0.5 U	0.5 U	24	0.01 U	0.85	0.01 U
MW32			06/12/08	Jul-08	18.89	201	0.24	4.75	1 U	10.8	1 U	1 U	4.26	0.31 J	1 U	2 U	1 U	1 U	2.23	1.14	7.87	ND	ND	3.34	11.2	ND	0.0936 J	0.148
MW32			10/06/08	Oct-08	19.17	233	0.21	3.65	713	7.97	5 U	5 U	3.89 J	2 U	5 U	10 U	5 U	5 U	2.56	1.06	9.08	5 U	5 U	5 U	8.54 J	0.01 U	0.0278 J	0.167
MW32			01/13/09	Jan-09	19.27	380	0.16	2.91	752	8.05	5 U	5 U	2.52 J	2 U	5 U	10 U	5 U	5 U	2.77	1.18	6.75	5 U	5 U	5 U	28.9	0.01 U	0.0319 J	0.199
MW32			04/07/09	Apr-09	19.11	344	1.3	4.16	835	7.69	2 U	2 U	2.86	0.8 U	2 U	4 U	2 U	2 U	3.73	1.05	8.66	5 U	5 U	5 U	27.1	0.0087 J	0.213	0.224
MW32		8	07/30/09	Jul-09	18.31	366	0	4.39	694	5.41	5 U	5 U	2.02 J	2 U	5 U	10 U	5 U	5 U	3.59	1.18	11.9	5 U	5 U	5 U	19.8	0.01 U	0.0508 J	0.173
MW32		8	10/14/09	Oct-09	18.75	-56	0	6.03	733	7.43	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	1580	0.169	19.2	5 U	5 U	1.19 J	2150	0.0078 J	75.4	0.907
MW32		8	01/06/10	Jan-10	17.41	-224	0	6.04	352	4.96	2 U	2 U	0.531 F	0.8 U	2 U	4 U	2 U	2 U										
MW32		8	04/07/10	Apr-10	17.03	-74	0	6.34	229	4.15	2 U	2 U	2 U	0.8 U	2 U	4 U	2 U	2 U	12.4	0.05 U	5 U	5 U	5 U	14.7	81.8	0.01 U	33.4	0.184
MW33		4	01/01/00*	Jan-00					76				ND	ND														
MW33		4	02/28/06	Mar-06	18.91	389.4	0.95	4.65	32.2	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U										
MW33		4	11/01/07	Nov-07	19.65	400	0.6	4.7											0.743 J	2.21	16.4	0.5 U	0.5 U	0.5 U	11.1	0.01 U	0.141	0.0527
MW33		4	01/01/08*	Jan-08					24.2	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	0.941 J	0	5.98	0.5 U	0.5 U	0.5 U	10.5	0.01 U	0.116	0.0472
MW33		4	03/24/08	Apr-08	19.47	225	0.73	4.15	22.4	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.89	2.28	7.14	0.5 U	0.5 U	0.5 U	10 U	0.01 U	0.389	0.0495
MW33		4	06/13/08	Jul-08	18.7	459.3	0.88	3.42	19	1 ND	1 ND	1 ND	1 ND	0 ND	1 ND	2 ND	1 ND	1 ND	5.76	2.2	12.2	ND	ND	0.693	22.4	ND	0.0856 J	0.0543
MW33		4	10/06/08	Oct-08	18.83	237	0.05	3.49	21.2	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.37	2.18	13.4	5 U	5 U	0.26 J	20.2	0.01 U	0.0455 J	0.0546
MW33		4	01/08/09	Jan-09	19.15	321	0.29	4.28	16.4	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.61	1.87	23.8	5 U	5 U	1.33 J	24.3	0.01 U	0.0971 J	0.0578
MW33		4	04/09/09	Apr-09	19.11	380	1.1	4.19	21.6	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.87	1.85	9.63	5 U	5 U	5 U	10	0.01 U	0.159	0.0629
MW33		4	07/29/09	Jul-09	18.3	207	0.56	4.74	22.8	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6.25	1.79	11.5	5 U	5 U	5 U	9.95 J	0.01 U	0.0364 J	0.0569
MW33		4	10/12/09	Oct-09	18.5	352	0	4.57	16	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.85	2.18	10.8	5 U	5 U	5 U	24.2	0.01 U	0.0452 J	0.058
MW33		4	04/07/10	Apr-10	17.66	354	3.9	3.9	18.9	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.81	2.06	12.3	5 U	5 U	5 U	9.75 J	0.01 U	0.055 J	0.0656
MW34		3	01/01/00*	Jan-00					54				ND	1.4														
MW34		3	03/02/06	Mar-06	16.83	237.9	1.26	4.17	137	18.1	1 U	1 U	1 U	0.71	1 U	2 U	1 U	1 U										
MW34		3	10/23/07	Nov-07	17.2	426	0.13	4.36											0.752 J	11.7	21.3	0.5 U	0.35 J	24.6	11.3	0.01 U	0.122	0.478
MW34		3	01/22/08	Jan-08	16.92	-89.6	4.08	5.13	105	11.5	1 U	1 U	1 U	0.503	1 U	2 U	1 U	1 U	8.75	0	11.9	0.5 U	0.5 U	26.4	26.2	0.01 U	3.01	0.478
MW34		3	03/24/08	Apr-08	16.5	233	0.38	4.88	100	11.5	1 U	1 U	1 U	0.493	1 U	2 U	1 U	1 U	6.1	9.55	8.5	0.5 U	0.5 U	8.53	10.2	0.01 U	2.9	0.423
MW34		3	06/12/08	Jul-08	16.34	89	0	5.78	96.1	11.2	1 U	1 U	1 U	0.497	1 U	2 U	1 U	1 U	15	2.06	8.59	ND	0.341 J	39.6	96.9	ND	24	0.471
MW34		3	10/02/08	Oct-08	16.15	-117	0	5.75	96.1 L	10.6 L	1 UL	1 UL	1 UL	0.418 L	1 UL	2 UL	1 UL	1 UL	29.7	1.84	9.33	5 U	0.559 J	20.5	105	0.01 U	18	0.473
MW34		3	01/07/09	Jan-09	16.31	-97	0	5.87	26.8	56.6	1 U	1 U	1 U	0.562	1 U	2 U	1 U	1 U	26.1	0.262	2.79 J	5 U	5 U	368	147	0.01 U	62.6	0.545
MW34		3	04/07/09	Apr-09	16.68	-174	0	5.88	29.9	67.8	1 U	1 U	1 U	0.52	1 U	2 U	1 U	1 U	5.14	0.52	3.33 J	5 U	5 U	1190	154	0.0129	81.2	0.423
MW34		3	07/22/09	Jul-09	15.88	-131	0	6.09	49.2	73.4	1 U	1.08	1 U	0.393 J	1 U	2 U	1 U	1 U	2.52	0.386	7.52	5 U	5 U	2090	114	0.0119	63.7	0.264
MW34		3	10/16/09	Oct-09	16.07	-117	0	6.7	1 U	102	1 U	0.87 J	1 U	0.462	1 U	2 U	1 U	1 U	172	0.343	12	100 U	100 U	2900	465	0.0071 J	86.7	0.481
MW34		3	04/05/10	Apr-10	14.81	68	0.51	5.82	101	39.8	1 U	3.04	1 U	0.34 J	1 U	2 U	1 U	1 U	1.3	2.11	28.2	5 U	5 U	1560	36.7	0.01 U	7.2	0.265
MW35			01/01/03*	Jan-03	17.02	77	3.4	8.87	4.2				ND	ND														
MW35			03/02/06	Mar-06	12.97	35.9	5.05	12.35	1.01	0.552 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	0.256 J										
MW35			11/01/07	Nov-07	13.87	-34	2.27	11.79											6.65	0.373 J	7.44	0.5 U	3.19	739	634	0.01 U	0.0745 J	0.0067 J
MW35			01/01/08*	Jan-08					7.8	1.16	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.95	0.6 U	6.22	0.5 U	0.621	180	330	0.01 U	0.1 U	0.01 U

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)	
MW35			04/03/08	Apr-08	13.4	-59	5.26	11.35	5.37	1	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	4.28	0.469	5.84	0.5 U	1.45	410	519	0.01 U	0.1 U	0.01 U	
MW35			07/10/08	Jul-08	12.77	-97	4.14	-14.31	5.56	0.69 J	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	3.71	0.468	8.09	ND	1.23	393	541	ND	0 ND	0 ND	
MW35			10/07/08	Oct-08	13	-124	1.7	13.2	10.8	1.51	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.67	0.449	8.87	5 U	5 U	2.2 J	69.2	0.01 U	0.101	0.01 U	
MW35			01/09/09	Jan-09	13.41	-89	5.72	11.76	8.85	1.27	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.49	0.569	5.95	5 U	1.09 J	174	189	0.01 U	0.1 U	0.01 U	
MW35			04/10/09	Apr-09	13.21	-50	6.44	11.8	7.33	1.14	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.52	0.461	4.43 J	5 U	1.13 J	199	360	0.01 U	0.0653 J	0.01 U	
MW35			07/27/09	Jul-09	12.98	-96	4.27	11.91	7.72	1.2	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.57	0.535	4.27 J	5 U	1	177	467	0.01 U	0.1 U	0.01 U	
MW35			10/16/09	Oct-09	13.7	-86	2.71	12.4	7.4	1.25	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	3.53	0.609	3.72 J	5 U	2.19 J	251	294	0.01 U	0.495	0.01 U	
MW35			04/06/10	Apr-10	12.19	-53	10.34	14+	4.94	0.615 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.49	0.565	5 U	5 U	5 U	154	184	0.01 U	0.0587 J	0.01 U	
MW36			01/01/03*	Jan-03	31.96	-3	4.26	11.41	ND				ND	ND															
MW37		2	01/01/03*	Jan-03	17.94	277	2	4.45	340				ND	0.8															
MW37		2	03/01/06	Mar-06	12.87	379.8	5.36	4.41	475	94	0.338 J	2.01	1 U	0.611	1 U	2 U	1 U	1 U											
MW37		2	11/01/07	Nov-07	14.35	359	0.22	3.91											4.47	0.488 J	10.8	1.07	1.41	450	10.4	0.01 U	0.335	2.01	
MW37		2	01/23/08	Jan-08	13.98	91	8.85	5.05	574	133	0.53 J	3.76	1 U	0.661	1 U	2 U	1 U	1 U	4.02	0	3.12 J	0.5 U	0.5 U	43.4	17.1	0.01 U	1.73	0.656	
MW37		2	03/26/08	Apr-08	13.34	220	3.28	4.25	684	180	5 U	2.96 J	5 U	0.96 J	5 U	10 U	5 U	5 U	4.28	0.21	3.14 J	0.5 U	0.5 U	78.8	10 U	0.01 U	0.517	0.857	
MW37		2	06/18/08	Jul-08	11.87	205	1.53	4.75	901	257	2.33	3.48	1 U	0.817	1 U	2 U	1.06	1 U	5.85	0.135	10.3	0.371 J	0.437 J	174	ND	ND	0.47	1.78	
MW37		2	10/03/08	Oct-08	13.8	337	0	4.18	1700	471	10 U	8.52 J	10 U	4 U	10 U	20 U	10 U	10 U	3.58	0.458	2.55 J	5 U	5 U	1.37 J	18.6	0.01 U	0.344	2.14	
MW37		2	01/09/09	Jan-09	13.81	297	3.79	3.33	908	243	5 U	2.83 J	5 U	0.766 J	5 U	10 U	5 U	5 U	3.23	0.083	3.07 J	5 U	5 U	74.9	39.5	0.01 U	0.535	1.78	
MW37		2	04/09/09	Apr-09	13.41	328	3.87	4.11	1120	285	5 U	5 U	5 U	4 U	5 U	10 U	5 U	5 U	3.66	0.143	3.74 J	5 U	5 U	244	28.5	0.01 U	0.37	2.51	
MW37		2/10	07/30/09	Jul-09	12.92	197	1.26	4.61	1010	461	10 U	3.37 J	10 U	4 U	10 U	20 U	10 U	10 U	5.03	0.157	7.4	5 U	5 U	197	21.1	0.0063 J	0.53	3.75	
MW37		2/10	10/12/09	Oct-09	13.28	279	0	4.41	1020	337	10 U	5.15 J	10 U	4 U	10 U	20 U	10 U	10 U	7.43	0.05 U	7.39	5 U	5 U	257	13.1	0.01 U	0.659	2.1	
MW37		2/10	01/06/10	Jan-10	10.98	201	3.72	3.98	542	227	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U											
MW37		2/10	04/07/10	Apr-10	10.52	19	3.03	5.87	354	333	2 U	0.867 J	2 U	0.571 J	2 U	4 U	2 U	2 U	12.1	0.05 U	15.9	5 U	5 U	360	70.3	0.01 U	27.8	3.77	
MW38			01/01/03*	Jan-03	17.3	177	2.3	5.85	ND				ND	ND															
MW38			03/07/06	Mar-06	10.46	286.6	2.88	5.02	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
MW38			11/06/07	Nov-07	11.42	308	0.51	4.52											0.52 J	2.85	36.2	0.5 U	0.5 U	1.8	9.2 J	0.01 U	0.384	0.0347	
MW38			04/01/08	Apr-08	11.48	275.6	3.85	5.01	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	0.877 J	0.503	6.5	0.5 U	0.5 U	0.591	10.7	0.01 U	1.06	0.0327	
MW38			07/10/08	Jul-08	9.59	267	3	5.25	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	1.09	0.593	5.6	ND	ND	ND	14	ND	0.575	0.032	
MW38			09/30/08	Oct-08	11.02	211	1.59	5.25	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.6	0.931	4.79 J	5 U	5 U	44	15.4	0.01 U	0.238	0.0356	
SW04			10/20/09	Oct-09					1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6.42										
SW04			04/20/10	Apr-10					1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
SW05			10/20/09	Oct-09					1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	8.08										
SW05			04/20/10	Apr-10					1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
SW06			10/20/09	Oct-09					1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	6.3										
SW06			04/20/10	Apr-10					1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
TMP01			11/08/07	Nov-07	12.61	168	0.57	4.53	4.08	4.56	1 U	1 U	1 U	0.361 J	1 U	2 U	1 U	0.46 J	1.2										
TMP01			07/16/08	Jul-08	11.97	182	0.3	4.6	3.88	3.46	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	1.71										
TMP02			11/08/07	Nov-07	10.55	78	0.7	5.13	9.81	8.06	1 U	3.34	1 U	0.221 J	1 U	0.709 J	0.289 J	1.1	4.94										
TMP02			07/17/08	Jul-08	10.72	2	3.62	5.69	10.1	8.39	0.78 J	2.21	1 U	0 U	1 U	2 U	1 U	1 U	16.6										
TMP03		7	10/19/07	Nov-07	18.71	-86	0.11	5.31	126	38.1	1 U	0.869 J	16.1	0.212 J	0.864 J	3.13	0.778 J	1.76	1 U										
TMP03		7	04/10/08	Apr-08	17.89	205.8	0.41	5.08	129	36	1 U	1.18	32.4	0.207 B	1 U	2 U	1 U	1 U											
TMP03		7	07/07/08	Jul-08	16.83	109	0.09	5.43	127	32.4	0.787	1.03	28.4	0.225	0.29	1.65	0.568	1 U	5.77										
TMP03		7	10/03/08	Oct-08	17.81	118	0	5.44	152	37.4	0.356 J	1.11	29.4	0.224 J	1 U	2 U	1 U	1 U	5.24										
TMP03		7	01/06/09	Jan-09	18.2	140	0	4.74	142	38.8	0.257 J	1.69	27.8	0.4 U	1 U	2 U	1 U	1 U	7.64										
TMP03		7	04/14/09	Apr-09	17.8	156	0.5	4.86	155	38.4	1 U	1.04	18.3	0.4 U	1 U	2 U	1 U	1 U	4.49										

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)
TMP04			10/19/07	Nov-07	20.36	107	1.11	5.12	39.1	24.4	1 U	1 U	49	0.4 U	1 U	2 U	1 U	0.38 J	2.09									
TMP04			07/09/08	Jul-08	18.65	193	0.13	4.98	44.7	21.4	1 U	1 U	55.9	0 U	1 U	2 U	1 U	1 U	5.38									
TMP05			10/19/07	Nov-07	18.65	244	0.95	4.9	3.26	0.968 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	0.975 J									
TMP05			07/09/08	Jul-08	17.74	194	0.04	4.82	74.9	20	1 U	0.82 J	12.4	0.396 J	1 U	2 U	1 U	1 U	4.42									
TMP06		5	10/17/07	Nov-07	20.19	215	0.8	4.99	1330	6.82	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	2.13									
TMP06		5	04/08/08	Apr-08	19.47	160	0.93	4.29	1130	4.62 J	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	4.02	1.16								
TMP06		5	07/07/08	Jul-08	18.25	185	0.56	4.67	820	7.63	10 U	10 U	10 U	R	10 U	20 U	10 U	10 U	5.62									
TMP06		5	10/03/08	Oct-08	19.31	306	0.39	4.48	608	2.9	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	7									
TMP06		5	01/06/09	Jan-09	19.66	-17	0	4.76	630	9.79	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	9.82									
TMP06		5	04/14/09	Apr-09	19.33	89	0.61	4.73	752	24.8	5 U	5 U	5 U	2 U	5 U	10 U	5 U	5 U	4.98									
TMP06		5	07/24/09	Jul-09	18.32	59	0	4.82	395	255	2 U	2 U	2 U	0.377 J	2 U	4 U	2 U	2 U	5.24									
TMP06		5	10/12/09	Oct-09	18.8	69	0	4.94	132	310	2.5 U	2.5 U	2.5 U	1 U	2.5 U	5 U	2.5 U	2.5 U	12									
TMP07			10/30/07	Nov-07	18.7	216	1.18	5.2	3.06	0.944 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.82									
TMP07			07/09/08	Jul-08	16.75	202	0.38	4.78	2.96	1.14	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	5.34									
TMP08		5	10/17/07	Nov-07	20.87	-70	0.74	5.08	1.02	0.338 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1 U									
TMP08		5	07/15/08	Jul-08	18.97	259	2.7	4.53	1.01	0.297 J	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	2.39									
TMP08		5	01/06/09	Jan-09	20.36	238	0	4.36	1.09	0.368 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	4.11									
TMP09		3	10/25/07	Nov-07	21.01	323	2.53	4.78	0.343 J	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1 U									
TMP09		3	07/11/08	Jul-08	20.08	193	2.3	4.17	1.83	0.503 J	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	8.98									
TMP10		3	10/25/07	Nov-07	20.69	178	0.3	5.54	5.21	0.607 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1 U									
TMP10		3	07/14/08	Jul-08	19.49	283	2.22	4.17	0.351 J	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	5.47									
TMP10		3	01/07/09	Jan-09	20.13	262	0	3.98	153	21.9	1 U	6.24	1 U	0.4 U	1 U	2 U	1 U	1 U	6.64									
TMP10		3	04/13/09	Apr-09	20.11	281	0.72	3.72	165	14.8	1 U	1.17	1 U	0.4 U	1 U	2 U	1 U	1 U	9.7									
TMP10		3	07/27/09	Jul-09	19.38	327	1.19	4.48	2.7	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	15.9									
TMP10		3	10/14/09	Oct-09	19.51	374	1.07	4.66	2.23	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	11.4									
TMP11			10/29/07	Nov-07	21.21	-3	2.18	8.02	16.6	6.57	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.82									
TMP11			07/15/08	Jul-08	19.1	67	1.76	6.6	13.2	6.03	0.684 J	1 U	1 U	0 U	1 U	2 U	1 U	1 U	2.54									
TMP12		4	10/17/07	Nov-07	19.67	222	1.76	4.76	0.88 J	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1 U									
TMP12		4	07/15/08	Jul-08	18.67	-165	1.32	6.8	0.954 J	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	667									
TMP13		1	11/06/07	Nov-07	13	198.5	0.6	4.82	1710	113	1.13	1 U	0.768 J	0.658	1 U	2 U	1 U	1 U	0.816 J									
TMP13		1	07/14/08	Jul-08	13.75	303	0.72	4.47	1030	151	10 U	10 U	10 U	6.36	10 U	20 U	10 U	10 U	5.72									
TMP13		1	01/07/09	Jan-09	15.31	339	0	4.16	556	83	5 U	5 U	5 U	4.6	5 U	10 U	5 U	5 U	4.29									
TMP13		1	04/15/09	Apr-09	15.15	359	0.51	3.95	581	66	5 U	5 U	5 U	4.24	5 U	10 U	5 U	5 U	6.56									
TMP13		1	07/27/09	Jul-09	14.08	323	0	4.3	466	66.5	2.5 U	2.5 U	2.5 U	5.1	2.5 U	5 U	2.5 U	2.5 U	12.1									
TMP13		1	10/12/09	Oct-09	14.49	195	0	4.41	330	45.9	5 U	5 U	5 U	4.06	5 U	10 U	5 U	5 U	6.02									
TMP14			10/29/07	Nov-07	18.99	190	2.12	5.1	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.44									
TMP15		3	10/16/07	Nov-07	17.12	225	0.61	4.78	155	16.5	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.2									
TMP15		3	04/08/08	Apr-08	16.31	27	0.05	5.52	183	16.9	0.328 J	1 U	1 U	0.331 J	1 U	2 U	1 U	1 U	302	0.403								
TMP15		3	07/11/08	Jul-08	15.81	39	0.02	5.8	122	11.5	1 U	1 U	1 U	0.338 J	1 U	2 U	1 U	1 U	456									
TMP15		3	10/02/08	Oct-08	16.31	-31	0.01	6.07	129	15.3	1 U	1 U	1 U	0.655	1 U	2 U	1 U	1 U	382									
TMP15		3	01/07/09	Jan-09	16.39	-64	0	6.02	80	69.2	1 U	1 U	1 U	0.433	1 U	2 U	1 U	1 U	129									
TMP15		3	04/15/09	Apr-09	15.68	-71	0.49	5.75	120	67.5	1 U	1 U	1 U	0.21 J	1 U	2 U	1 U	1 U	8.8									
TMP15		3	07/24/09	Jul-09	16.32	-101	0	5.81	130	52.4	1 U	1 U	1 U	0.177 J	1 U	2 U	1 U	1 U	7.92									
TMP15		3	10/12/09	Oct-09	15.85	-88	1.95	5.88	125	60.4	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	628									

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)
TMP16		1	10/26/07	Nov-07	15.16	25	2.95	5.05	1590	170	1.31	1.07	0.793 J	1.49	1 U	2 U	1 U	1 U	1.38									
TMP16		1	03/28/08	Apr-08	14.32	299.7	0.37	5.46	665	145	5 U	3.18 J	5 U	6.75	5 U	10 U	5 U	5 U	10.3									
TMP16		1	07/10/08	Jul-08	12.9	186	0.05	4.95	646	167	1.19	4.78	1 U	5.16	1 U	2 U	1 U	1 U	7.24									
TMP16		1	10/02/08	Oct-08	14.17	294	0	4.23	912 L	183	1.71	4.48	1 U	6.24	1 U	2 U	1 U	1 U	5.01									
TMP16		1	01/08/09	Jan-09	14.62	67	0	4.54	294	66.6	0.553 J	1.71 J	2 U	5.01	2 U	4 U	2 U	2 U	61.2									
TMP16		1	04/14/09	Apr-09	14.25	235	0.44	4.57	294	96.6	0.894 J	0.915 J	1 U	4.85	1 U	2 U	1 U	1 U	11.4									
TMP16		1	07/24/09	Jul-09	13.1	-5	0	5.43	96.5	370	0.836 J	1.11 J	2 U	2.98	2 U	4 U	2 U	2 U	24.5									
TMP16		1	10/13/09	Oct-09	13.51	-5	0	5.89	28.3	618	5 U	2.32 J	5 U	3.86	5 U	10 U	5 U	5 U	64.8									
TMP17			10/30/07	Nov-07	15.02	313	0.06	4.54	195	22.3	1 U	1 U	1 U	0.221 J	1 U	2 U	1 U	1 U	5.87									
TMP17			07/14/08	Jul-08	13.35	368	1.47	4.16	147	17.3	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	6.35									
TMP18		1	10/26/07	Nov-07	13.97	29	0.06	5.06	52.5	10.9	1 U	1 U	1 U	1.16	1 U	2 U	1 U	1 U	1 U									
TMP18		1	03/28/08	Apr-08	13.11	94.8	0.34	6.12	34.6	7.24	1 U	1 U	1 U	0.986	1 U	2 U	1 U	1 U	3									
TMP18		1	07/10/08	Jul-08	11.7	149	0.06	5.77	35.7	6.1	1 U	1 U	1 U	1.39	1 U	2 U	1 U	1 U	5.86									
TMP18		1	10/03/08	Oct-08	13.04	13	0	5.81	41.2	8.57	1 U	1 U	1 U	1.98	1 U	2 U	1 U	1 U	4.44									
TMP18		1	01/08/09	Jan-09	13.41	139	0	5.18	33.4	7.04	1 U	1 U	1 U	1.38	1 U	2 U	1 U	1 U	3.89									
TMP19		1	11/05/07	Nov-07	15.41	183	0.16	4.66	24.8	4.1	1 U	1 U	1 U	11	1 U	2 U	1 U	1 U	1 U									
TMP19		1	07/14/08	Jul-08	13.26	278	1.39	4.72	8.65	1.05	1 U	1 U	1 U	0.574	1 U	2 U	1 U	1 U	6.35									
TMP19		1	04/15/09	Apr-09	14.52	311	0.6	4.41	4.64	0.419 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	5.82									
TMP20		2	10/31/07	Nov-07	12.54	176	4.34	5.58	32.3	4.88	1 U	1 U	1 U	0.236 J	1 U	2 U	1 U	1 U	1.97									
TMP20		2	04/09/08	Apr-08	12.83	168.2	1.1	5.51	23.7	3.39	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	0.37 J	4.58									
TMP20		2	07/14/08	Jul-08	11.88	194	1.95	5.31	15.2	2.07	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	4.7									
TMP20		2	10/06/08	Oct-08	12.86	164	0	5.6	12.8	1.6	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.8									
TMP20		2	01/09/09	Jan-09	12.76	118	0	5.29	12.8	2.48	1 U	1 U	1 U	0.224 J	1 U	2 U	1 U	1 U	2.99									
TMP20		2	04/17/09	Apr-09	12.36	184	0.18	5.28	12.6	7.4	1 U	1 U	1 U	0.788	1 U	2 U	1 U	1 U	4.41									
TMP21			11/05/07	Nov-07	13.67	95	0.23	4.77	1 U	1 U	1 U	1 U	1 U	0.235 J	1 U	2 U	1 U	1 U	1.81									
TMP21			07/16/08	Jul-08	12.71	259	1.1	4.45	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	1.53									
TMP22			10/25/07	Nov-07	17.66	148	3.25	5.24	34.3	4.75	1 U	0.513 J	1 U	0.4 U	1 U	2 U	1 U	1 U	2.98									
TMP22			07/15/08	Jul-08	15.72	262	1.52	4.52	111	19.2	1 U	1.48	0.76 J	0.185 J	1 U	2 U	1 U	1 U	5.61									
TMP23		2	10/30/07	Nov-07	12.15	140	0.02	4.91	118	41.2	1 U	1.79	1 U	0.826	1 U	2 U	1 U	1 U	3.92									
TMP23		2	04/09/08	Apr-08	11.11	279.1	1.69	4.41	148	45.6	0.377 J	2.01	1 U	0.897	1 U	2 U	1 U	1 U	5.18									
TMP23		2	07/07/08	Jul-08	11.08	185	0	4.49	137	42	0.849	3.13	1 U	0.955	1 U	2 U	1 U	1 U	5.84									
TMP23		2	10/06/08	Oct-08	11.35	318	0	4.36	92.6	30.6	1 U	1.76	1 U	0.649	1 U	2 U	1 U	1 U	2.54									
TMP23		2	01/12/09	Jan-09	11.32	241	1.98	3.97	134	46.7	1 U	3.15	1 U	0.779	1 U	2 U	1 U	1 U	3.22									
TMP23		2	04/15/09	Apr-09	11.05	331	0.55	3.88	167	53.2	1 U	2.7	1 U	0.737	1 U	2 U	1 U	1 U	5.4									
TMP24			11/02/07	Nov-07	8.7	55	2.09	4.9	1 U	1 U	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U	1.66									
TMP24			07/14/08	Jul-08	7.26	262	2.26	4.41	1 U	1 U	1 U	1 U	1 U	0 U	1 U	2 U	1 U	1 U	2.32									
TMP25		2	02/11/09	Feb-09	11.16	93	8.14	5.35	691	730		ND	ND						15.4									
TMP25		2	04/16/09	Apr-09	10.85	162	0	4.42	933	1770	25 U	7 J	25 U	10 U	25 U	50 U	25 U	25 U	22.8									
TMP25		2	07/29/09	Jul-09	10.31	87	0	5.18	421	1790	10 U	5.79 J	10 U	4 U	10 U	20 U	10 U	10 U	39.6	0.223								
TMP25		2/10	10/13/09	Oct-09	10.64	19	2.82	5.81	247	1610	10 U	8.4 J	10 U	4 U	10 U	20 U	10 U	10 U	66.4									
TMP25		2/10	04/05/10	Apr-10	7.97	-84	0	6.2	94.2	767	5 U	3.29 J	5 U	2 U	5 U	10 U	5 U	5 U										
TMP26		2	02/11/09	Feb-09	10.7	-203	0	6.43	36.3	929		ND	ND						276									
TMP26		2	04/15/09	Apr-09	10.4	-185	0	6.31	10 U	1170	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	184									
TMP26		2/10	07/28/09	Jul-09	9.9	-179	0	6.61	10 U	1140	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	146									

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

**Appendix D: Cumulative Site ST-14 Groundwater Data
Andrews Air Force Base, Camp Springs, MD**

LOCID	PDS Area	Barrier	Sample Date	Event	DTW (ft. BTOC)	ORP (mV)	DO (mg/L)	pH	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)	CT (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Toluene (µg/L)	TOC (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Alkalinity (mg/L)	As (mg/L)	Fe (mg/L)	Mg (mg/L)	
TMP26		2/10	10/13/09	Oct-09	10.22	-170	0	6.75	10 U	1120	10 U	10 U	10 U	4 U	10 U	20 U	10 U	10 U	195										
TMP26		2	04/05/10	Apr-10	7.81	-158	0	6.85	4.09 J	971	5 U	2.55 J	5 U	2 U	5 U	10 U	5 U	5 U											
TMP27		2	02/11/09	Feb-09	10.21	-79	0.19	4.4	1270	297		5.42	ND						6.92										
TMP27		2/10	04/05/10	Apr-10	7.1	47	0.98	6.68	4.04	0.708 J	1 U	1 U	1 U	0.4 U	1 U	2 U	1 U	1 U											
TMP28		2	02/13/09	Feb-09	12.2	-7.07	1.09	4.97	366	89		ND	ND						6.72										
TMP28		2/10	04/07/10	Apr-10	9.27	184	0	5.25	491	179	2 U	2.06	2 U	0.8 U	2 U	4 U	2 U	2 U											

U, ND = Analyte not detected above MDL

J = Estimated Quantity

Blank cells indicate that no data is available or the analyte was not tested

* = Approximate date

APPENDIX E
CHAIN-OF-CUSTODY FORMS

Company Name: AELDM						NUMBER OF CONTAINERS	Hold	VOCs	RSK-175	ALKALINITY	METALS (Fe, Mn, As)	SULFATE	TOC/NO3/NO2	TOTAL # (LAB USE)	Program	
Project Contact: DEVON CHIGDINE		Contact Phone #: 703 549 8728		<input type="checkbox"/> CWA	<input type="checkbox"/> RCRA											
Turn Around Requirements: STD		Location: ANDREWS AFB		<input type="checkbox"/> DOD	<input type="checkbox"/> AFCEE											
Project ID: SS-22/ST-14 PBR		Signature: <i>[Signature]</i>		<input type="checkbox"/> Other												
Sampler (print): MIKE GLINSKI				ADDITIONAL REQUIREMENTS												
Sample I.D. No.	Comp	Grab	Date			Time	Matrix*									
ST14-MWD3-111	X		04/06/10	1000	WG	10	3	3	1	1	1	1				
ST14-MWD4-111	X		04/06/10	1230	WG	10	3	3	1	1	1	1				
MW15-ST14-110	X		04/06/10	1324	WG	10	3	3	1	1	1	1				
MW24-ST14-111	X		04/06/10	1510	WG	10	3	3	1	1	1	1				
MW35-ST14-111	X		04/06/10	1445	WG	10	3	3	1	1	1	1				
FQC-040610-001	X		03/30/10	1519	WA	2	2	0	0	0	0	0				TRIP BLANK
<i>[Large diagonal signature and date: 04/06/10]</i>																
Relinquished by: <i>[Signature]</i>		Date: 04/06/10	Time: 1600	Received by: <i>[Signature]</i>		Relinquished by: <i>[Signature]</i>		Date:	Time:	Received by: <i>[Signature]</i>						
Relinquished by: <i>[Signature]</i>		Date:	Time:	Received for Laboratory by: <i>[Signature]</i>		Date:	Time:	Remarks:								

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

L10040134

COC No. A 15602

158 Starlite Drive
Marietta, OH 45750



Phone: 740-373-4071
Fax: 740-373-4835



CHAIN-OF-CUSTODY RECORD

Company Name: **AECOM**

Project Contact: **DEVON CHILDINE** Contact Phone #: **703 549 8728**

Turn Around Requirements: **STD** Location: **ANDREWS AFB**

Project ID: **SS-22/ST-14 PBR**

Sampler (print): **MIKE GLINSKI** Signature: *[Signature]*

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS	Hold	VOCs	RSK-175	ALKALINITY	METALS (Pb, Mn, As)	SULFATE	TOC/NO3/NO2	TOTAL # (LAB USE)	Program		ADDITIONAL REQUIREMENTS
															<input type="checkbox"/> CWA	<input type="checkbox"/> RCRA	
ST14-MW03-111	X		04/06/10	1000	WG	10		3	3	1	1	1	1			<input type="checkbox"/>	
ST14-MW04-111	X		04/06/10	1230	WG	10		3	3	1	1	1	1			<input type="checkbox"/>	
MW15-ST14-118	X		04/06/10	1324	WG	10		3	3	1	1	1	1			<input type="checkbox"/>	
MW24-ST14-111	X		04/06/10	1510	WG	10		3	3	1	1	1	1			<input type="checkbox"/>	
MW35-ST14-111	X		04/06/10	1445	WG	10		3	3	1	1	1	1			<input type="checkbox"/>	
FAC-040610-001	X		03/30/10	1519	WR	2		2	0	0	0	0	0			<input type="checkbox"/>	TRIP BLANK
70040610																<input type="checkbox"/>	not on COC
MW10-ST14-110	X		04/05/10	0000	WG	10		3	3	1	1	1	1			<input type="checkbox"/>	
<i>[Large diagonal signature and date: 04/06/10]</i>																	

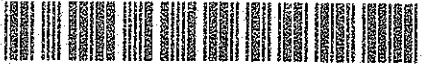
Relinquished by: *[Signature]* Date: **04/06/10** Time: **1600** Rec (Sig): **Microbac OVD**

Relinquished by: **ANNIE BROWN** Date: _____ Time: _____ Rec (Sig): _____

Received by: _____ Date: _____ Time: _____

Remarks: _____

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



CHAIN-OF-CUSTODY RECORD

Company Name: HECOM						NUMBER OF CONTAINERS	Hold	VOL% RSK-175	ALKALINITY	METALS (Fe, Mn, As)	SULFATE	TOC/NO ₂ /NO ₃	TOTAL # (LAB USE)	Program	
Project-Contact: DEVON CHICONE		Contact Phone #: 403,549,8728		<input type="checkbox"/> CWA											
Turn Around Requirements: STANDARD		Location: ANDREWS AFB		<input type="checkbox"/> RCRA											
Project ID: SS-22/ST-14 PBR		Signature: <i>[Signature]</i>		<input type="checkbox"/> DOD											
Sampler (print): MATT SCHARF		Signature: <i>[Signature]</i>		<input type="checkbox"/> AFCEE											
Sample I.D. No.		Comp	Grab	Date	Time	Matrix*							ADDITIONAL REQUIREMENTS		
F01-TB040510-001			X	03/30/10	1519	WG	2	2	0	0	0	0			TRIP BLANK
MW34-ST14-111			X	04/05/10	1100	WG	10	3	3	1	1	1			
ST14-MW08-110			X	04/05/10	1029	WG	10	3	3	1	1	1			
TMP24-ST14-102			X	04/05/10	1145	WG	3	3	0	0	0	0			DO NOT VALIDATE
MW30-ST14-110			X	04/05/10	1340	WG	10	3	3	1	1	1			
MW06-MTS															
ST14-MW06-110			X	04/05/10	1232	WG	10	3	3	1	1	1			
TMP26-ST14-105			X	04/05/10	1355	WG	3	3	0	0	0	0			DO NOT VALIDATE
TMP25-ST14-105			X	04/05/10	1535	WG	3	3	0	0	0	0			DO NOT VALIDATE
10A04-ST14-101			X	04/06/10	1030	WG	3	3	0	0	0	0			DO NOT VALIDATE
10A03-ST14-101			X	04/06/10	1230	WG	3	3	0	0	0	0			DO NOT VALIDATE
10A02-ST14-101			X	04/06/10	1425	WG	3	3	0	0	0	0			DO NOT VALIDATE
10A01-ST14-101			X	04/06/10	1630	WG	3	3	0	0	0	0			DO NOT VALIDATE
Relinquished by: (Signature) <i>[Signature]</i>		Date	Time	Received by: (Signature)		Relinquished by: (Signature)		Date	Time	Received by: (Signature)					
Relinquished by: (Signature)		Date	Time	Received for Laboratory by: (Signature)		Date	Time	Remarks:							

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

COC No. A 15641

158 Starlite Drive
Marietta, OH 45750

Microbac

Phone: 740-373-4071
Fax: 740-373-4835



CHAIN-OF-CUSTODY RECORD

L10040148

Company Name: AECOM						NUMBER OF CONTAINERS	Hold	VOLs	RSK-175	ALKALINITY	METALS (Fe, Mn, As)	SULFATE	TOC/NO ₃ /NO ₂	TOTAL # (LAB USE)	Program	
Project Contact: DEVON CHICOINE			Contact Phone #: 703.549.8428												<input type="checkbox"/> CWA	<input type="checkbox"/> RCRA
Turn Around Requirements: STANDARD			Location: ANDREWS AFB												<input type="checkbox"/> DOD	<input type="checkbox"/> AFCEE
Project ID: SS-22/ST-14 PBR			Sampler (print): MATT SCHAEF												Other _____	
Signature: <i>[Signature]</i>			ADDITIONAL REQUIREMENTS													
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*											
F06 TB040710-001		K			WG	2	2	0	0	0	0	0	0			TRIP BLANK
TMP28-ST14-102	X		04/02/10	1025	WG	3	3	0	0	0	0	0				Do NOT VALIDATE
MW34-ST14-111	X		04/04/10	1255	WG	10	3	3	1	1	1	1				VALIDATE VOLs ONLY
MW22-ST14-108	X		04/04/10	1050	WG	10	3	3	1	1	1	1				VALIDATE VOLs ONLY
MW33-ST14-111	X		04/04/10	1400	WG	10	3	3	1	1	1	1				VALIDATE VOLs ONLY
MW16-ST14-111	X		04/04/10	1445	WG	10	3	3	1	1	1	1				VALIDATE VOLs ONLY
MW32-ST14-111	X		04/04/10	0940	WG	10	3	3	1	1	1	1				VALIDATE VOLs ONLY
MW33-ST14-111 DCP	X		04/02/10	1400	WG	3	3	0	0	0	0	0				DUPLICATE
MW16-ST14-111 MS	X		04/04/10	1445	WG	3	3	0	0	0	0	0				VALIDATE VOLs ONLY
MW16-ST14-111 MSD	X		04/04/10	1445	WG	3	3	0	0	0	0	0				VALIDATE VOLs ONLY
MW23-ST14-111	X		04/04/10	1135	WG	10	3	3	1	1	1	1				VALIDATE VOLs ONLY
MW24-ST14-110	X		04/04/10	1355	WG	10	3	3	1	1	1	1				VALIDATE VOLs ONLY
Relinquished by: <i>[Signature]</i> Date: 04/02/10 Time: 1800						Relinquished by: <i>[Signature]</i> Date: 04/03/2010						Received by: (Signature)		Remarks:		
Relinquished by: (Signature)						Microbac OVD Received: 04/08/2010 10:30 By: ROBIN KLINGER						221000005313				
Relinquished by: (Signature)						<i>Robin L. Klinger</i>										

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



Company Name: **AECOM**

Project Contact: **DEVON CHICOINE** Contact Phone #: _____

Turn Around Requirements: **STD** Location: **ANDREWS AFB**

Project ID: **ST14/5522 PBR**

Sampler (print): **MIKE GLINSKI** Signature: *[Signature]*

Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	NUMBER OF CONTAINERS										TOTAL # (LAB USE)	ADDITIONAL REQUIREMENTS	
						Hold	VOCs	RSK-175	Metals	Toc/No ₃ /No ₂	SO ₄	Alkalinity						
FQC-040810-001		X	03/30/10	1519	WG	2	2	0	0	0	0	0						
ST14-MW02-109		X	04/08/10	1030	WG	10	3	3	1	1	1							
ST14-MW05-110		X	04/08/10	1200	WG	16	9	3	1	1	1	1					MS/MSD	
ST14-MW01-109		X	04/08/10	1330	WG	10	3	3	1	1	1							
MW19-ST14-111		X	04/08/10	1440	WG	10	3	3	1	1	1							
ST14-MW09-110		X	04/08/10	1245	WG	10	3	3	1	1	1						DUP	
MW03-3471-108		X	04/08/10	1525	WG	10	3	3	1	1	1							
MW12-ST14-112		X	04/08/10	1545	WG	10	3	3	1	1	1							
<i>[Large diagonal signature across the table]</i>																		
VALIDATE VOCs ONLY																		

Relinquished by: *[Signature]* Date: **4/9/10** Time: **1800** Received by: _____ (Signature)

Relinquished by: _____ (Signature) Date: _____ Time: _____ Received by: _____ (Signature)

Relinquished by: _____ (Signature) Date: _____ Time: _____ Received for Laboratory by: _____ (Signature) Date: _____ Time: _____ Remarks: _____

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



Company Name: RECOM						NUMBER OF CONTAINERS	Hold	VOL% VOLS	ESK-175	ALKALINITY	METALS (Fe, Pb, Mn)	SULFATE	TOC/NO3/NO2	Program		TOTAL # (LAB USE)	<input type="checkbox"/> CWA <input type="checkbox"/> RCRA <input type="checkbox"/> DOD <input type="checkbox"/> AFCEE <input type="checkbox"/> Other	
Project Contact: DEVON CHICOINE			Contact Phone #: 703-549-8728											ADDITIONAL REQUIREMENTS				
Turn Around Requirements: STD			Location: ANDREWS AFB											ADDITIONAL REQUIREMENTS Trip Blank Ambient Blank Eq. Blank Eq. Blank				
Project ID: SS-22/ST-14 PBR																		
Sampler (print): MIKE GLINSKI			Signature: <i>[Signature]</i>															
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*													
FGL-TB040910-001	X		03/30/10	1519	WQ	2		20	00	00	00	00						
ST14-MN07-111	X		04/09/10	1035	WG	10		33	11	11	11							
MW11-ST14-111	X		04/09/10	1030	WG	10		33	11	11	11							
MW13-ST14-118	X		04/09/10	1233	WG	10		33	11	11	11							
MW31-ST14-110	X		04/09/10	1245	WG	10		33	11	11	11							
FGL-AB040910-001	X		04/09/10	1420	WQ	3		30	00	00	00							
FGL-EB040910-001	X		04/09/10	1402	WQ	3		30	00	00	00							
FGL-EB040910-002	X		04/09/10	1410	WQ	3		30	00	00	00							
MA [Signature]												*FOR ALL SAMPLES: Validate VOLS ONLY*						
04/09/10																		
Relinquished by: <i>[Signature]</i>			Date: 4/9/10	Time: 1600	Received by: <i>[Signature]</i>			Relinquished by: <i>[Signature]</i>			Date	Time	Received by: <i>[Signature]</i>					
Relinquished by: <i>[Signature]</i>			Date	Time	Received for Laboratory by: <i>[Signature]</i>			Date	Time	Remarks:								

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)



Company Name: AECOM						NUMBER OF CONTAINERS	Hold	VOCs	RSK-175	ALKALINITY	METALS (Fe, As, Mn)	SULFATE	TOC/NO ₃ /NO ₂	TOTAL # (LAB USE)	Program <input type="checkbox"/> CWA <input type="checkbox"/> RCRA <input type="checkbox"/> DOD <input type="checkbox"/> AFCEE <input type="checkbox"/> Other _____												
Project Contact: DEVON CHICOINE		Contact Phone #: 403.549.8728		Turn Around Requirements: STANDARD											Location: ANDREWS AFB		Project ID: SS-22/ST-74 PBR		Sampler (print): MATT SCHWARTZ		Signature: <i>[Signature]</i>		ADDITIONAL REQUIREMENTS				
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*																						
FOC-TBO40910-007		<input checked="" type="checkbox"/>	03/31/10	1240	WQ										2		2	0	0	0	0	0					TRIP BLANK
NW17-ST14-111			04/09/10	1620	WQ										10		3	3	1	1	1	1					
MW17-ST14-111DUP		<input checked="" type="checkbox"/>	04/09/10	1620	WQ	3		3	0	0	0	0	0			DUPLICATE											
<p><i>[Large handwritten signature]</i></p> <p>* VALIDATE VOCs ONLY FOR ALL SAMPLES *</p>																											
Relinquished by: (Signature) <i>[Signature]</i>		Date 04/09/10	Time 1800	Received by: (Signature) _____		Relinquished by: (Signature) _____		Date	Time	Received by: (Signature) _____																	
Relinquished by: (Signature) _____		Date	Time	Received for Laboratory by: (Signature) _____		Date	Time	Remarks:																			

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Company Name: AECOM					NUMBER OF CONTAINERS	Hold	VOLCS	BSX-145	ALKALINITY	METALS (Fe, Mn, As)	SULFATE	TOC/NO ₃ /NO ₂	TOTAL # (LAB USE)	Program	
Project Contact: DEVON CHICOINE		Contact Phone #: 703,549.8428		<input type="checkbox"/> CWA										<input checked="" type="checkbox"/> RCRA	
Turn Around Requirements: STANDARD		Location: ANDREWS AFB		<input type="checkbox"/> DOD										<input type="checkbox"/> AFCEE	
Project ID: SS-22/ST-14 PBR		Sampler (print): MATT SCHAEF		Signature: <i>[Signature]</i>											
Signature: <i>[Signature]</i>		Signature: <i>[Signature]</i>		ADDITIONAL REQUIREMENTS											
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	Hold	VOLCS	BSX-145	ALKALINITY	METALS (Fe, Mn, As)	SULFATE	TOC/NO ₃ /NO ₂	TOTAL # (LAB USE)	Program	
FGL-TB041210-001	X		03/30/10	1519	WQ	2	2	0	0	0	0	0		TRIP BLANK	
MWR9-5714-104	X		04/12/10	1205	WQ	10	3	3	1	1	1	1		EQUIPMENT BLANK	
FGL-EB041210-001	X		04/12/10	1250	WQ	3	3	0	0	0	0	0		* VALIDATE VOLCS ONLY FOR ALL SAMPLES	
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Relinquished by: <i>[Signature]</i>			Date: 04/12/10	Time: 1600	Received by: <i>[Signature]</i>			Relinquished by: <i>[Signature]</i>			Date:	Time:	Received by: <i>[Signature]</i>		
Relinquished by: <i>[Signature]</i>			Date:	Time:	Received for Laboratory by: <i>[Signature]</i>			Date:	Time:	Remarks:					

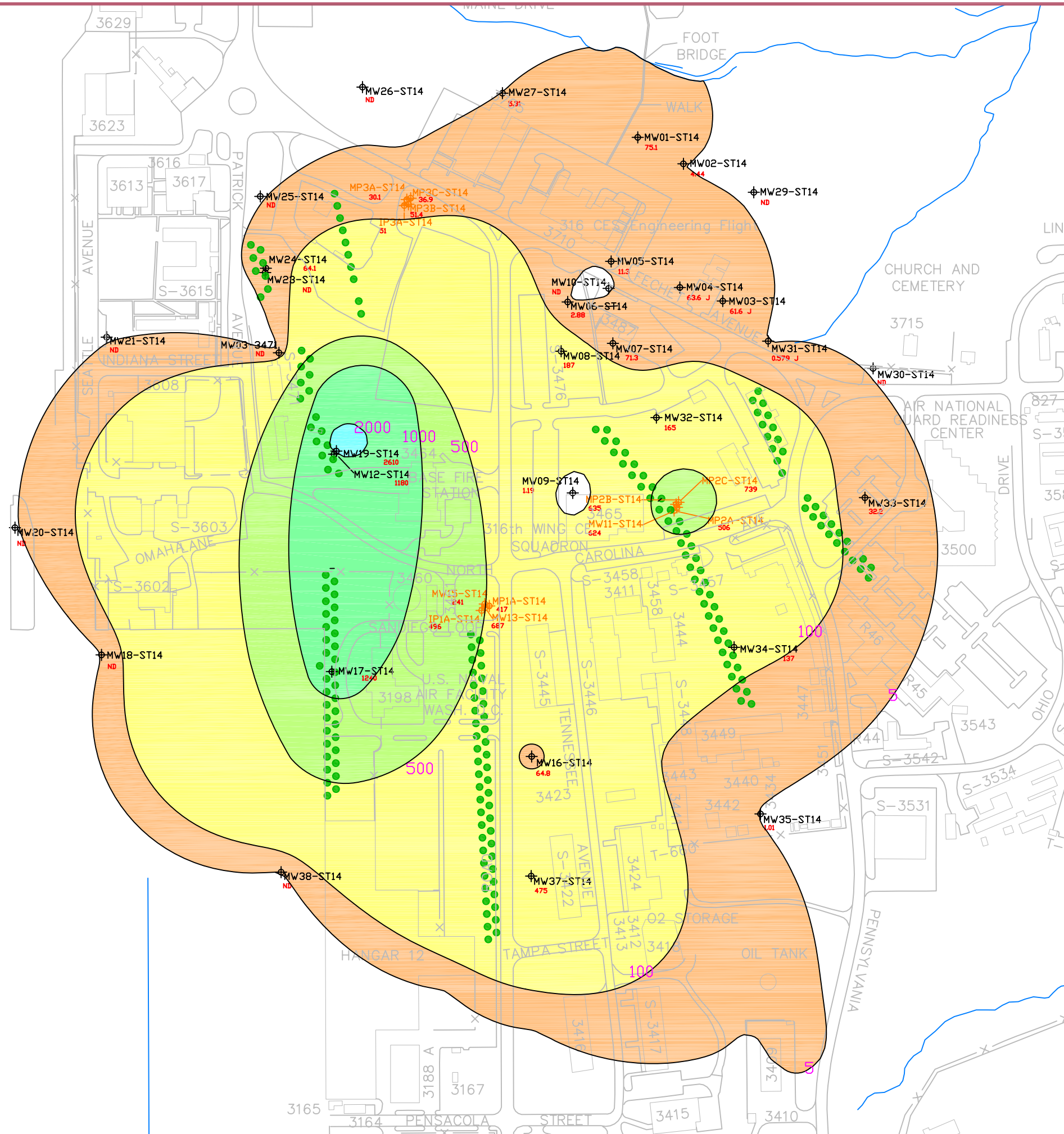
*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Company Name: <i>AECOM</i>						NUMBER OF CONTAINERS	Hold	VOLs	TOL	TOTAL # (LAB USE)	Program			
Project Contact: <i>DEVON CHICOINE</i>			Contact Phone #: <i>703.549.8728</i>								<input type="checkbox"/> CWA	<input type="checkbox"/> RCRA		
Turn Around Requirements: <i>14-DAY</i>			Location: <i>ANDREWS AFB</i>								<input type="checkbox"/> DOD	<input type="checkbox"/> AFCEE		
Project ID: <i>SS-22/ST-14 PBR</i>											<input type="checkbox"/> Other _____	ADDITIONAL REQUIREMENTS		
Sampler (print): <i>MATT SCHARF</i>			Signature: <i>[Signature]</i>											
Sample I.D. No.	Comp	Grab	Date	Time	Matrix*	Hold	VOLs	TOL	TOTAL # (LAB USE)					
<i>FQC-TB042010-001</i>	<i>X</i>		<i>03/30/10</i>	<i>1519</i>	<i>WQ</i>	<i>2</i>	<i>2</i>	<i>0</i>				<i>TRIP BLANK</i>		
<i>SW06-5714-105</i>	<i>X</i>		<i>04/20/10</i>	<i>1105</i>	<i>WS</i>	<i>4</i>	<i>3</i>	<i>1</i>						
<i>SW05-5714-105</i>	<i>X</i>		<i>04/20/10</i>	<i>1120</i>	<i>WS</i>	<i>4</i>	<i>3</i>	<i>1</i>						
<i>SW04-5714-105</i>	<i>K</i>		<i>04/20/10</i>	<i>1130</i>	<i>WS</i>	<i>4</i>	<i>3</i>	<i>1</i>						
<i>[Large Signature]</i> <i>04/20/2010</i>														
Relinquished by: (Signature) <i>[Signature]</i>			Date <i>04/20/10</i>	Time <i>1500</i>	Received by: (Signature) _____			Relinquished by: (Signature) _____		Date _____	Time _____	Received by: (Signature) _____		
Relinquished by: (Signature) _____			Date _____	Time _____	Received for Laboratory by: (Signature) _____			Date _____	Time _____	Remarks: _____				

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

APPENDIX F
TCE, BTEX, & CT PLUME MAPS
(MARCH 2006 BASELINE, APRIL 2008,
JULY 2008, OCTOBER 2008, JANUARY 2009,
APRIL 2009, JULY 2009, AND OCTOBER 2009)

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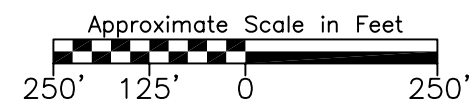
- ⊕ MW17-ST14 MONITORING WELL
- SODIUM LACTATE INJECTION POINT
- ⊕ MP3B-ST14 PDS INJECTION OR MONITORING POINT
- 1240 TCE CONCENTRATION IN ug/L, MARCH 2006
- 5-100 ug/L TCE
- 100-500 ug/L TCE
- 500-1000 ug/L TCE
- 1000-2000 ug/L TCE
- 2000+ ug/L TCE

NOTES:

ND = Non Detect. TCE was not detected in the sample from this location.

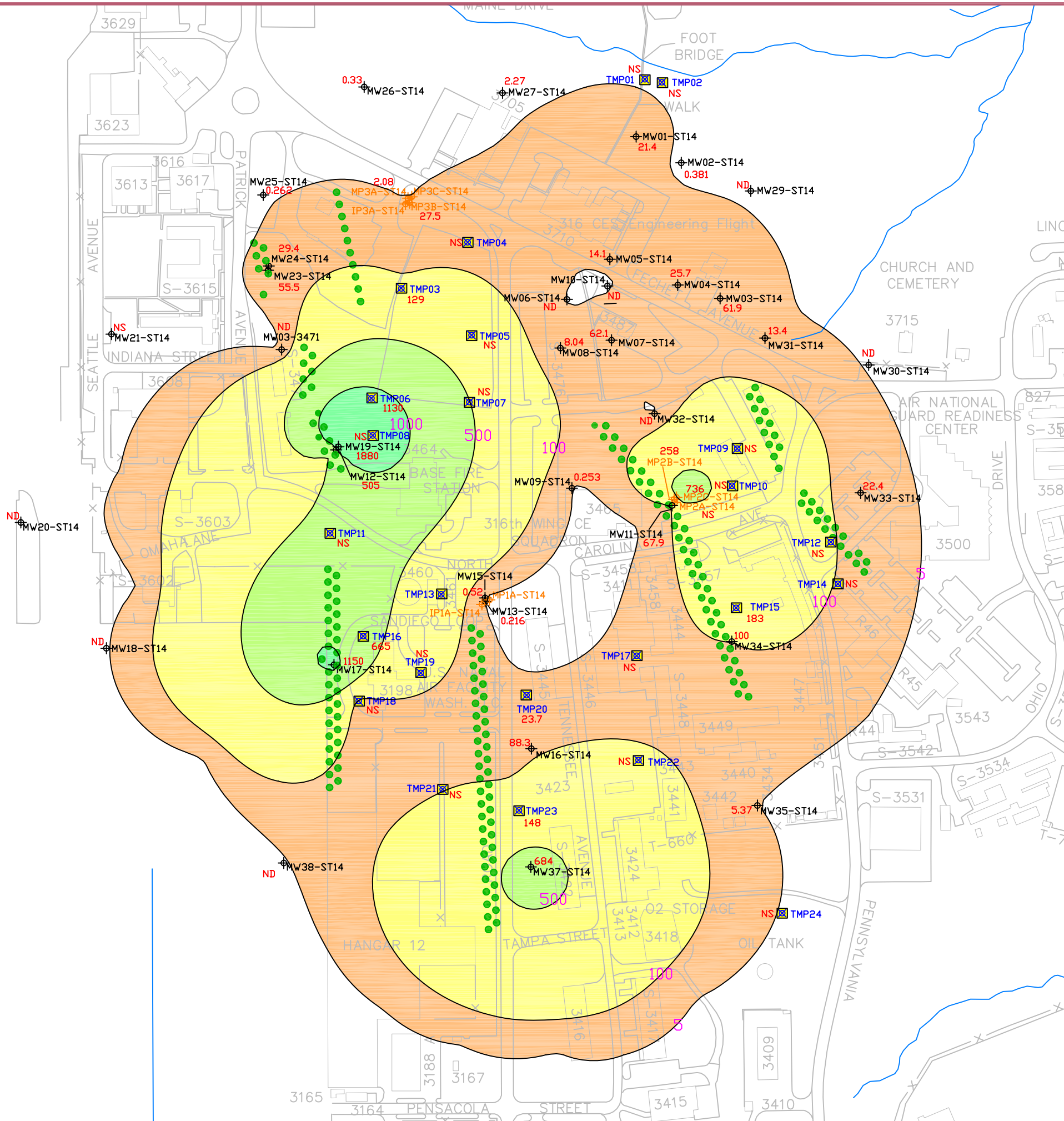
PDS = Pre-Design Study

Sodium lactate injection points installed August-October 2007.



<p>675 N. Washington St, Suite 300 Camp Springs, MD 21044 T 703.549.8728 F 703.549.9134 WWW.AECOM.COM</p>	<p>Andrews AFB ST-14 Performance Monitoring Camp Springs, MD</p> <p>TCE Isoconcentration Contours - March 2006</p>																				
<p>PROJECT START DATE (M/Y) June 2005</p> <p>PROJECT NO. 89023</p> <p>FILENAME TCE_032006.dwg</p> <p>SHEET NO.</p> <p>DRAWING NO.</p>																					
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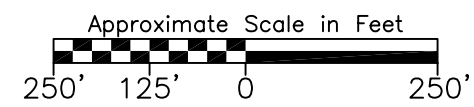
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- SODIUM LACTATE INJECTION POINT
- ⊕ TMP03 TEMPORARY MONITORING POINT
- ⊕ MP3B-ST14 PDS INJECTION OR MONITORING POINT
- 1240 TCE CONCENTRATION IN $\mu\text{g/L}$, APRIL 2008
- 5-100 $\mu\text{g/L}$ TCE
- 100-500 $\mu\text{g/L}$ TCE
- 500-1000 $\mu\text{g/L}$ TCE
- 1000+ $\mu\text{g/L}$ TCE

NOTES:

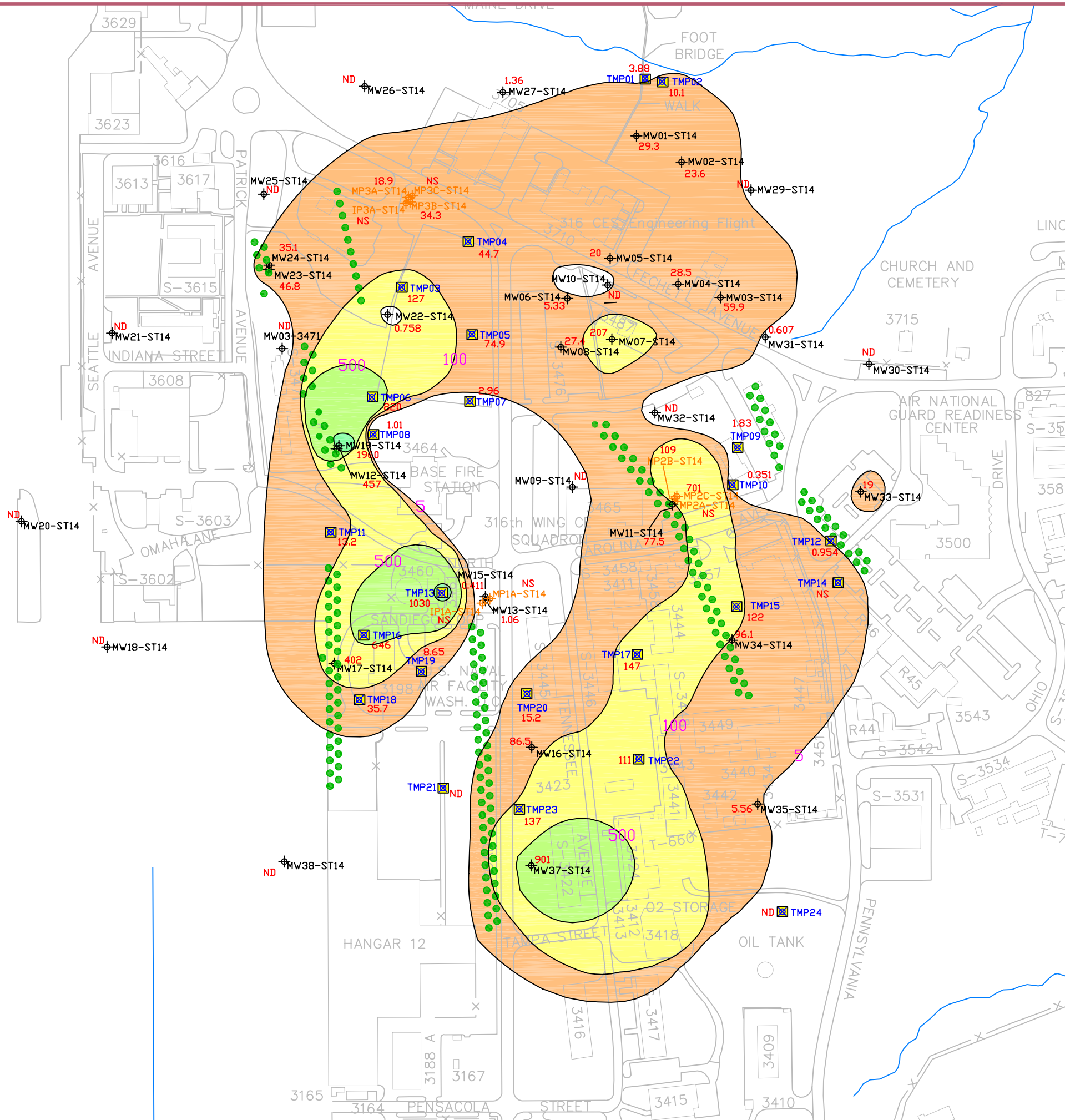
ND = Non Detect. TCE was not detected in the sample from this location.

NS = Not Sampled. A sample was not collected from this location.

PDS = Pre-Design Study



<p>675 N. Washington St, Suite 300 Camp Springs, MD 21044 T: 703.549.8728 F: 703.549.9134 WWW.AECOM.COM</p>	<p>Andrews AFB ST-14 Performance Monitoring Camp Springs, MD</p> <p>TCE Isoconcentration Contours - April 2008</p>
<p>PROJECT START DATE (M/Y) June 2005</p> <p>PROJECT NO. 89023</p> <p>FILENAME TCE_LTM1.dwg</p> <p>SHEET NO.</p> <p>DRAWING NO.</p>	
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LEGEND

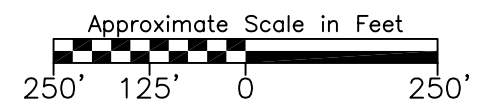
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- SODIUM LACTATE INJECTION POINT
- ⊕ TMP03 TEMPORARY MONITORING POINT
- ⊕ MP3B-ST14 PDS INJECTION OR MONITORING POINT
- 1240 TCE CONCENTRATION IN ug/L, JULY 2008
- 5-100 ug/L TCE
- 100-500 ug/L TCE
- 500-1000 ug/L TCE
- 1000+ ug/L TCE

NOTES:

ND = Non Detect. TCE was not detected in the sample from this location.

NS = Not Sampled. A sample was not collected from this location.

PDS = Pre-Design Study



CRK BY:	DES BY:	CHK BY:	APP BY:	REV	DESCRIPTION	DRN	CHK	DATE (MM/YY)

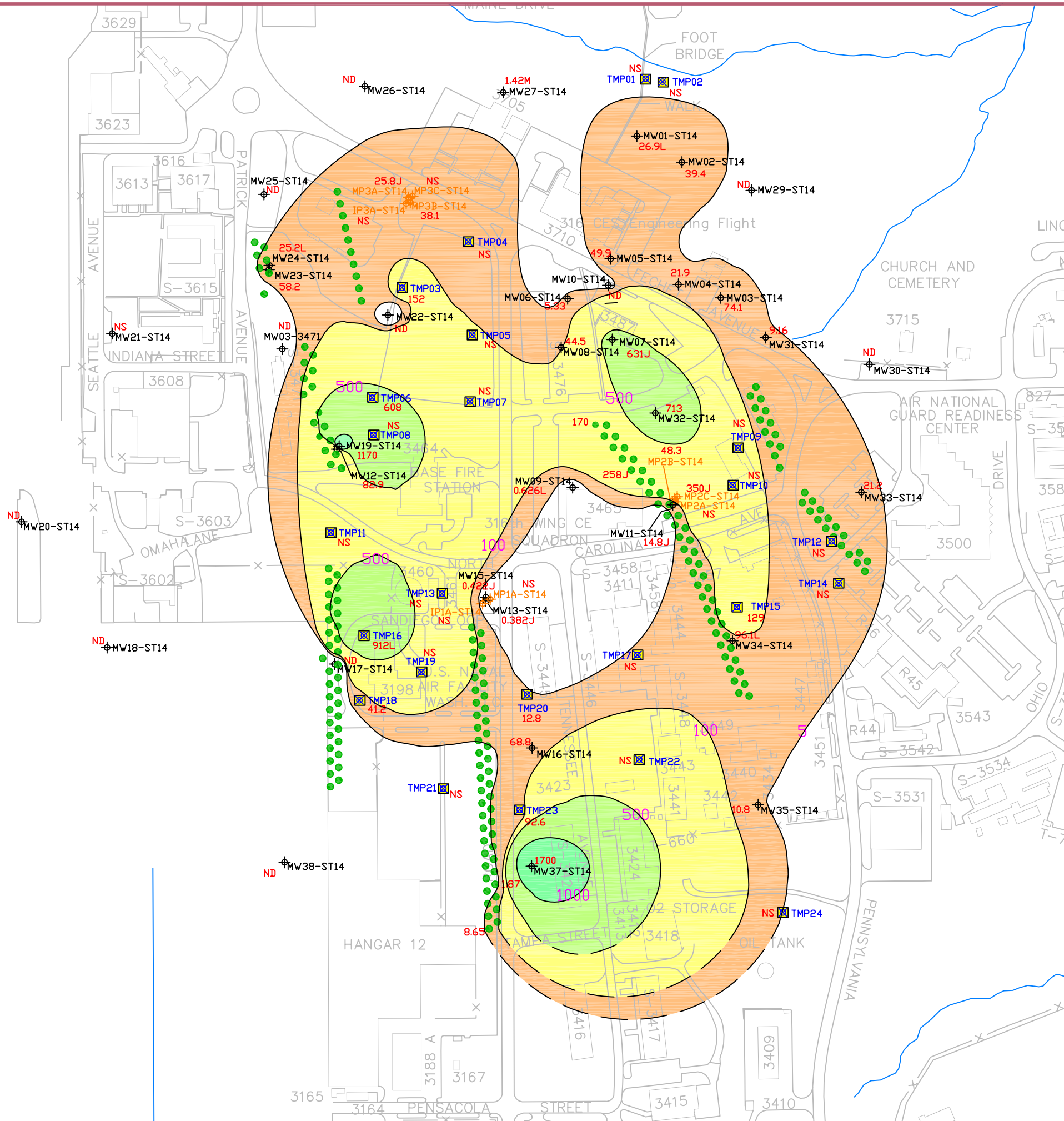
675 N. Washington St., Suite 300
Camp Springs, MD 21044
T 703.549.8728 F 703.549.9134
WWW.AECOM.COM

**Andrews AFB
ST-14 Performance Monitoring
Camp Springs, MD**

TCE Isoconcentration Contours - July 2008

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	TCE LTM2.dwg
SHEET NO.	
DRAWING NO.	

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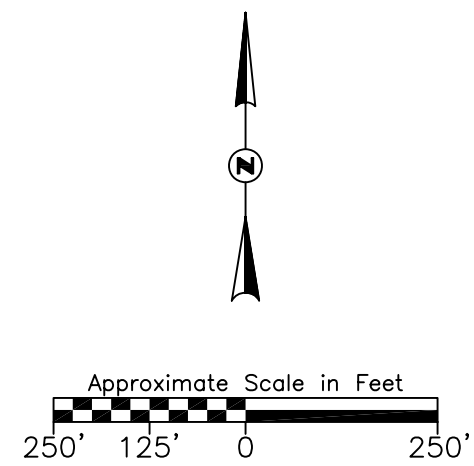
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- SODIUM LACTATE INJECTION POINT
- ⊕ TMP03 TEMPORARY MONITORING POINT
- ⊕ MP3B-ST14 PDS INJECTION OR MONITORING POINT
- 1240 TCE CONCENTRATION IN ug/L, OCTOBER 2008
- 5-100 ug/L TCE
- 100-500 ug/L TCE
- 500-1000 ug/L TCE
- 1000+ ug/L TCE
- PROJECTED CONTOUR (LIMITED DATA)

NOTES:

ND = Non Detect. TCE was not detected in the sample from this location.

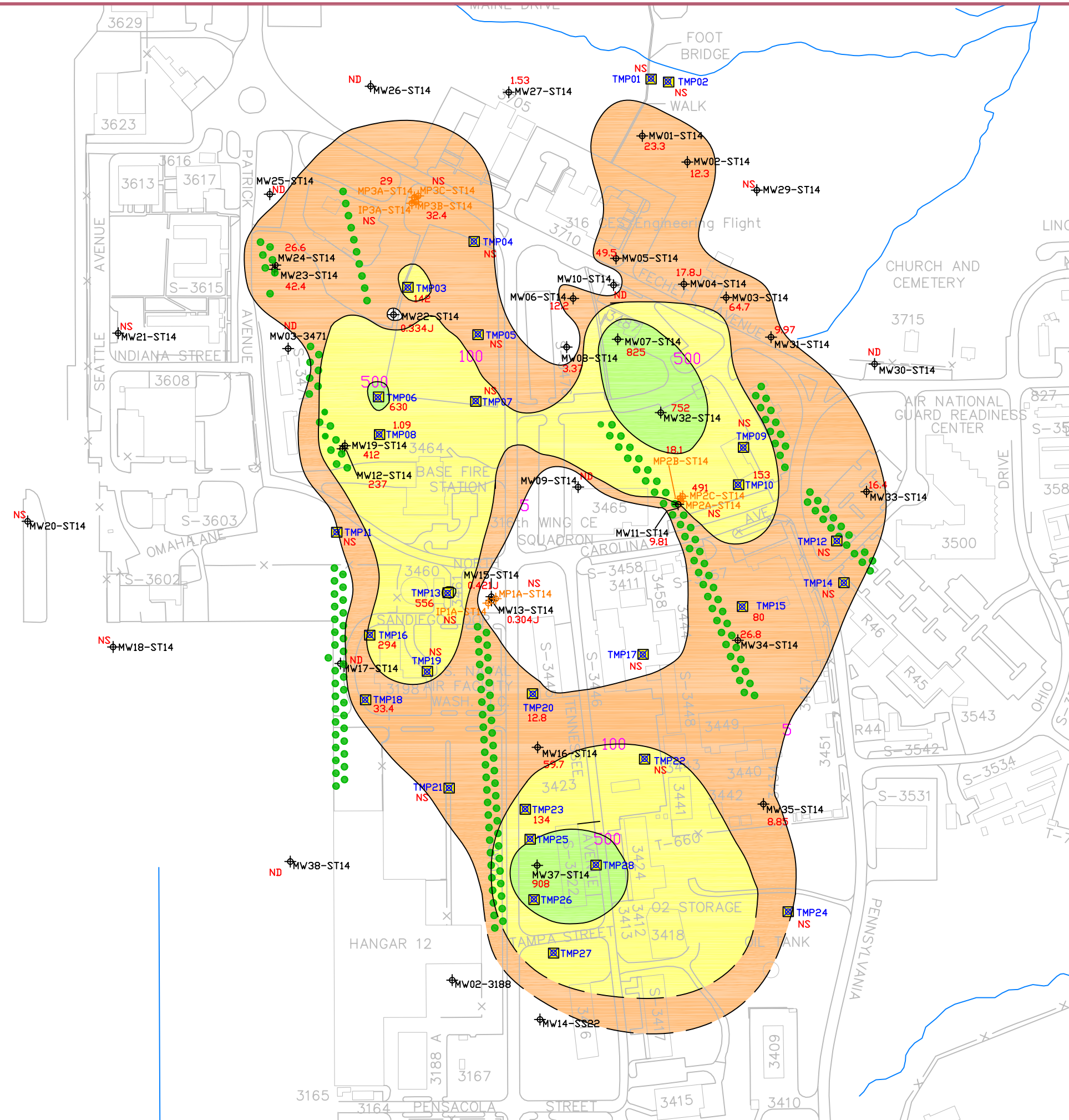
NS = Not Sampled. A sample was not collected from this location.

PDS = Pre-Design Study



	<p>Andrews AFB ST-14 Performance Monitoring Camp Springs, MD</p> <p>TCE Isoconcentration Contours - October 2008</p>
<p>PROJECT START DATE (M/Y) June 2005</p>	
<p>PROJECT NO. 89023</p>	
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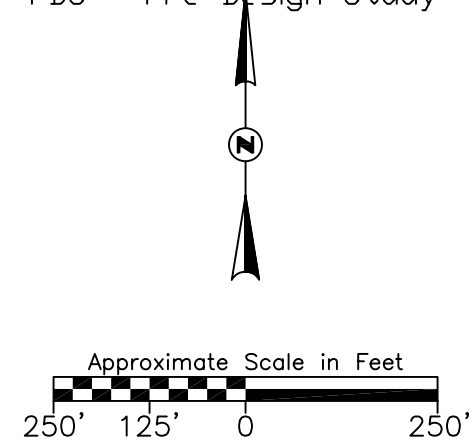
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- MW17-ST14 MONITORING WELL
- SODIUM LACTATE INJECTION POINT
- TMP03 TEMPORARY MONITORING POINT
- MP3B-ST14 PDS INJECTION OR MONITORING POINT
- 1240 TCE CONCENTRATION IN ug/L, JANUARY 2009
- GROUNDWATER FLOW DIRECTION

- 5-100 ug/L TCE
- 100-500 ug/L TCE
- 500-1000 ug/L TCE

PROJECTED CONTOUR (LIMITED DATA)

NOTES:
 ND = Non Detect. TCE was not detected in the sample from this location.
 NS = Not Sampled. A sample was not collected from this location.
 PDS = Pre-Design Study



DRN	CHK	DATE (MM/YY)

VERIFY SCALE IF PLAN SHEET IS REDUCED

1-INCH

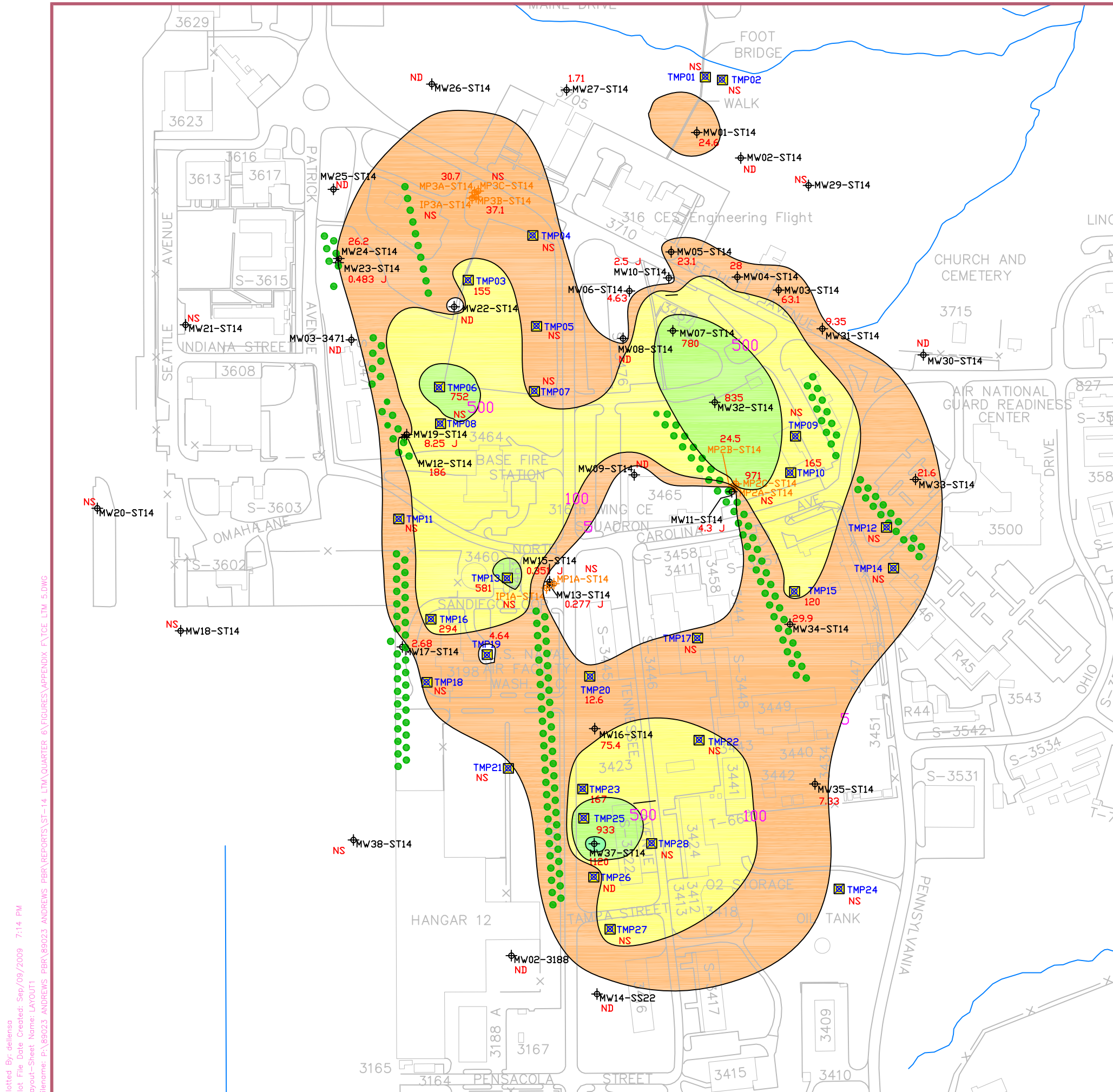
DRN BY: DES BY: CHK BY: APP BY:

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**Andrews AFB
 ST-14 Performance Monitoring
 Camp Springs, MD**

TCE Isoconcentration Contours - January 2009

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	TCE_LTM4.dwg
SHEET NO.	
DRAWING NO.	



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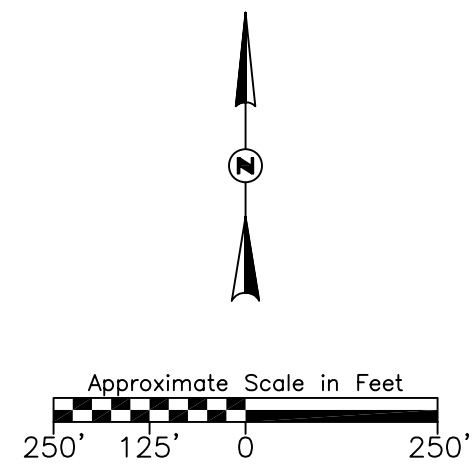
- MW17-ST14 MONITORING WELL
- SODIUM LACTATE INJECTION POINT
- TMP03 TEMPORARY MONITORING POINT
- MP3B-ST14 PDS INJECTION OR MONITORING POINT
- 1240 TCE CONCENTRATION IN ug/L, APRIL 2009
- 5-100 ug/L TCE
- 100-500 ug/L TCE
- 500-1000 ug/L TCE
- 1000+ ug/L TCE

NOTES:

ND = Non Detect. TCE was not detected in the sample from this location.

NS = Not Sampled. A sample was not collected from this location.

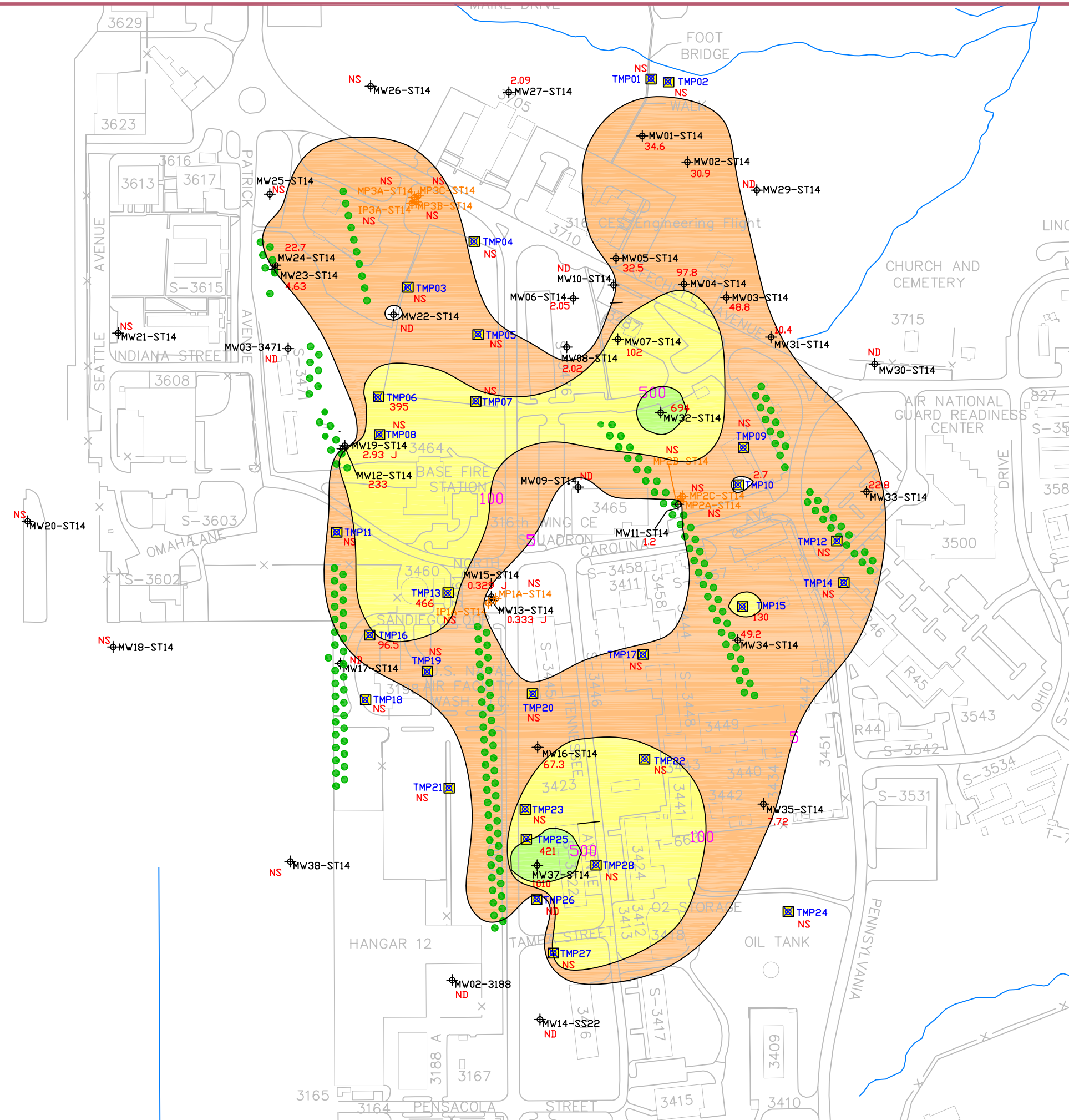
PDS = Pre-Design Study



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 675 N. Washington St., Suite 300 Camp Springs, MD 21044 T: 703.549.8728 F: 703.549.9134 WWW.AECOM.COM	Andrews AFB ST-14 Performance Monitoring Camp Springs, MD TCE Isoconcentration Contours - April 2009	VERIFY SCALE IF PLAN SHEET IS REDUCED 1-INCH = 100 FEET 1-INCH = 100 FEET	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>CHK</th> <th>DATE (MM/YY)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	REV	DESCRIPTION	CHK	DATE (MM/YY)																
REV	DESCRIPTION	CHK	DATE (MM/YY)																				
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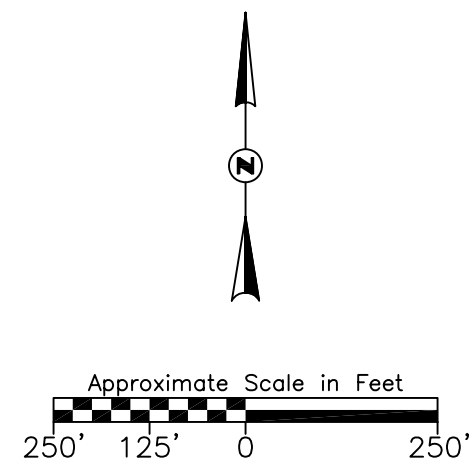
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LEGEND

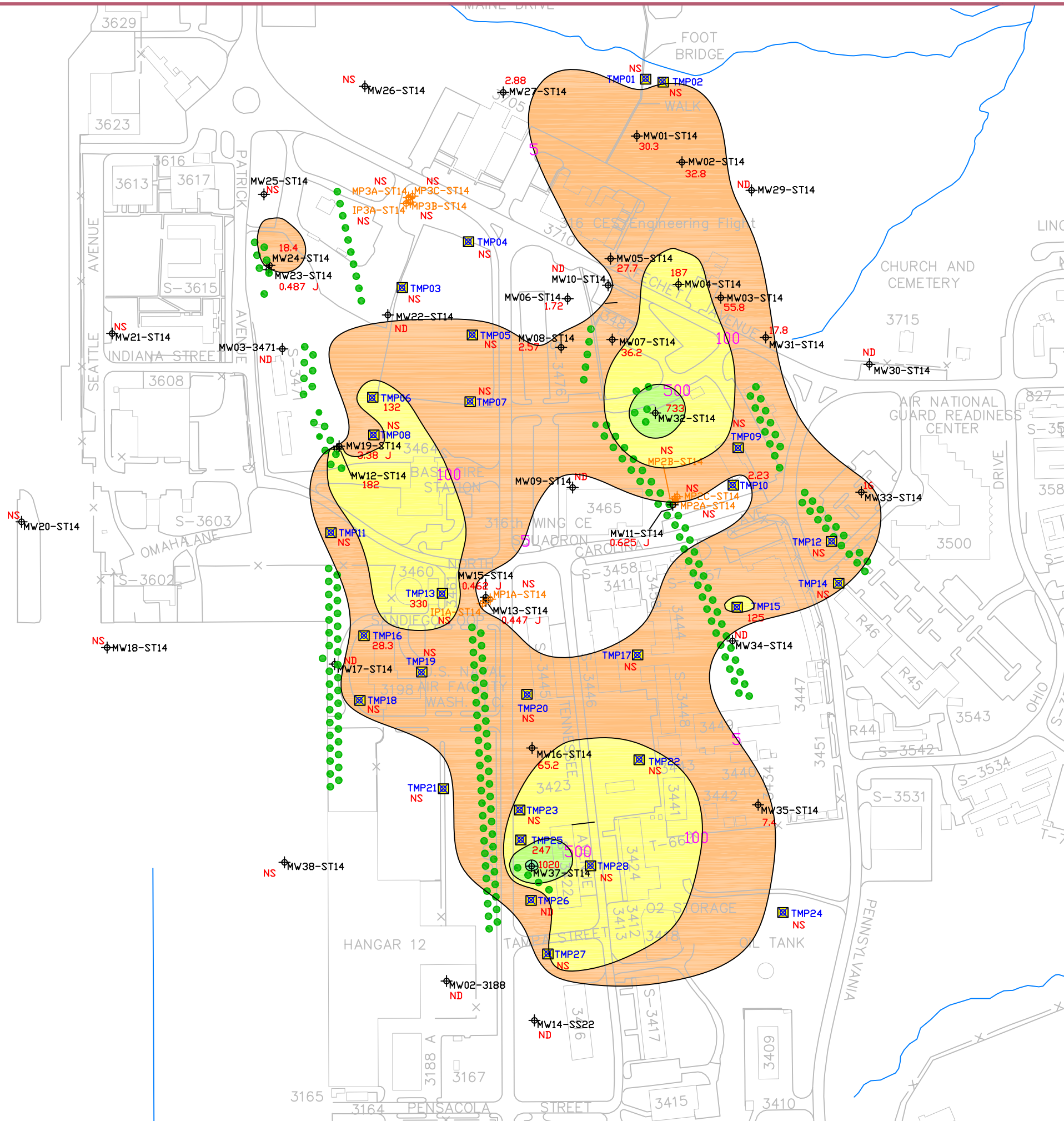
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- SODIUM LACTATE INJECTION POINT
- ⊕ TMP03 TEMPORARY MONITORING POINT
- ⊕ MP3B-ST14 PDS INJECTION OR MONITORING POINT
- 1240 TCE CONCENTRATION IN ug/L, JULY 2009
- 5-100 ug/L TCE
- 100-500 ug/L TCE
- 500-1000 ug/L TCE
- 1000+ ug/L TCE

NOTES:
 ND = Non Detect
 NS = Not Sampled
 PDS = Pre-Design Study



Andrews AFB ST-14 Performance Monitoring Camp Springs, MD	
TCE Isoconcentration Contours - July 2009	
PROJECT START DATE (M/Y) June 2005	
PROJECT NO. 89023	
FILENAME Fig 5-1 Jul 09 TCE.dwg	
SHEET NO.	
DRAWING NO.	

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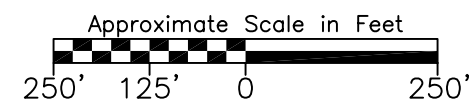


LEGEND

- MW17-ST14 MONITORING WELL
- SODIUM LACTATE INJECTION POINT
- TMP03 TEMPORARY MONITORING POINT
- PDS INJECTION OR MONITORING POINT
- 1240 TCE CONCENTRATION IN $\mu\text{g/L}$, OCTOBER 2009
- 5-100 $\mu\text{g/L}$ TCE
- 100-500 $\mu\text{g/L}$ TCE
- 500-1000 $\mu\text{g/L}$ TCE
- 1000+ $\mu\text{g/L}$ TCE

NOTES:

- ND = Non Detect
- NS = Not Sampled
- PDS = Pre-Design Study



REV	DESCRIPTION	CHK	DATE (M/D/Y)

AECOM

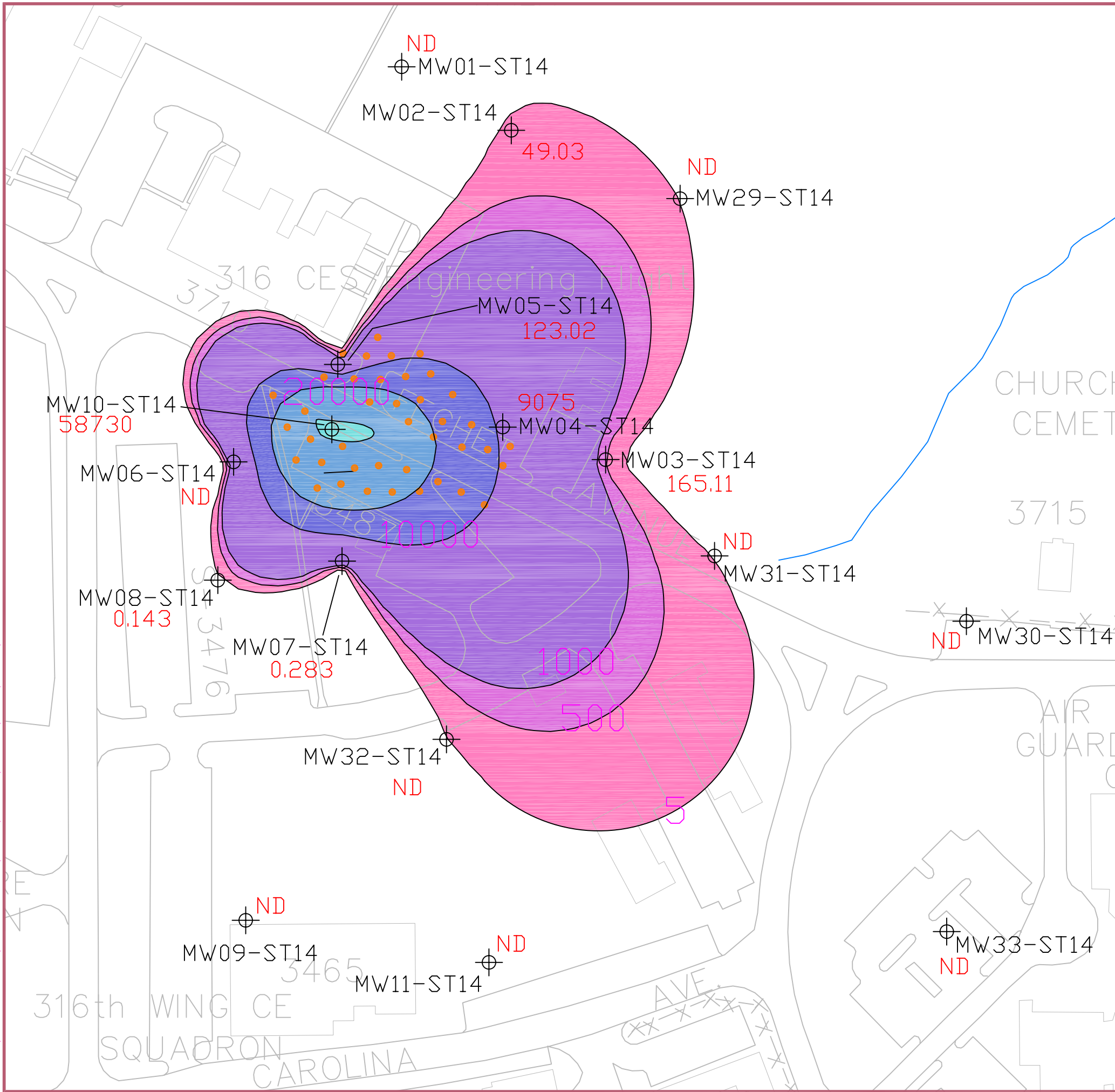
675 N. Washington St., Suite 300
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 WWW.AECOM.COM

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TCE Isoconcentration Contours - October 2009

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	Fig 5-1 Oct 09 TCE.dwg
SHEET NO.	
DRAWING NO.	

Plotted By: dellensa
 Plot File Date Created: Aug/18/2009 5:12 PM
 Layout-Sheet Name: LAYOUT1
 Filename: P:\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 5\FIGURES\APPENDIX\BTEX_032006.DWG



LEGEND

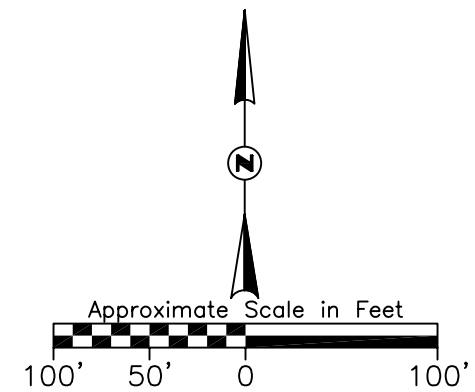
- MW03-ST14 MONITORING WELL
- PermeQx PLUS INJECTION POINT
- 165.11 TOTAL BTEX CONCENTRATION IN ug/L, MARCH 2006
- 5-500 ug/L BTEX
- 500-1000 ug/L BTEX
- 1000-10,000 ug/L BTEX
- 10,000-20,000 ug/L BTEX
- 20,000-50,000 ug/L BTEX
- 50,000+ ug/L BTEX

NOTES:

ND = Non Detect. BTEX compounds were not detected in the sample from this location.

Total BTEX is the sum of benzene, toluene, ethylbenzene, m,p-xylenes and o-xylenes.

PermeQx Plus injections were performed in October 2007.



REV	DESCRIPTION	DRN	CHK	DATE (MM/YY)

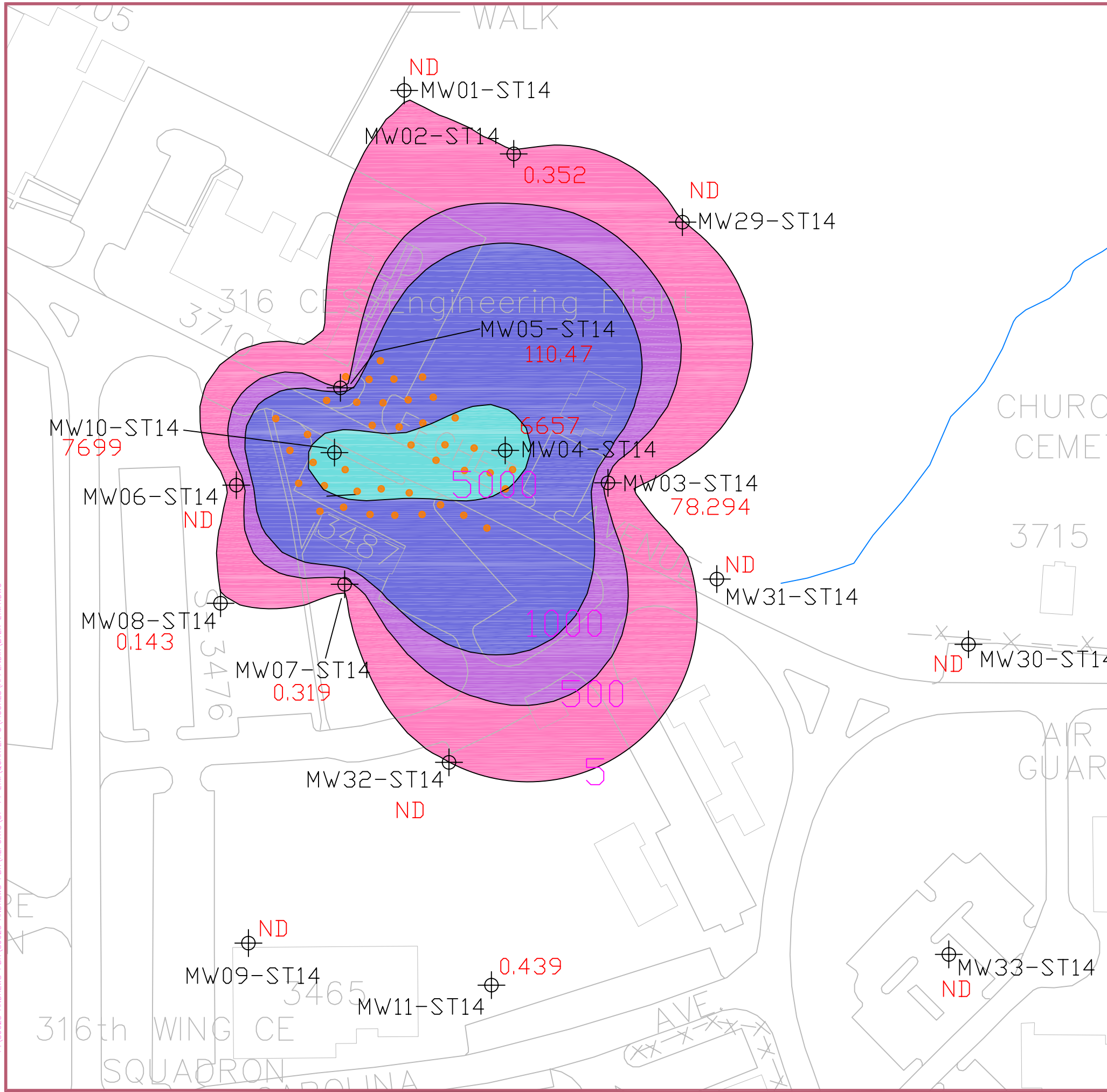
AECOM
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BTEX Isoconcentration Contours - March 2006

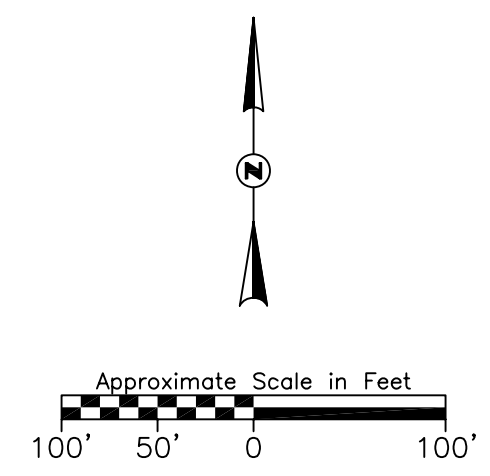
PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	BTEX_032006.dwg
SHEET NO.	
DRAWING NO.	

Plotted By: dellensa
 Plot File Date Created: Aug/18/2009 5:13 PM
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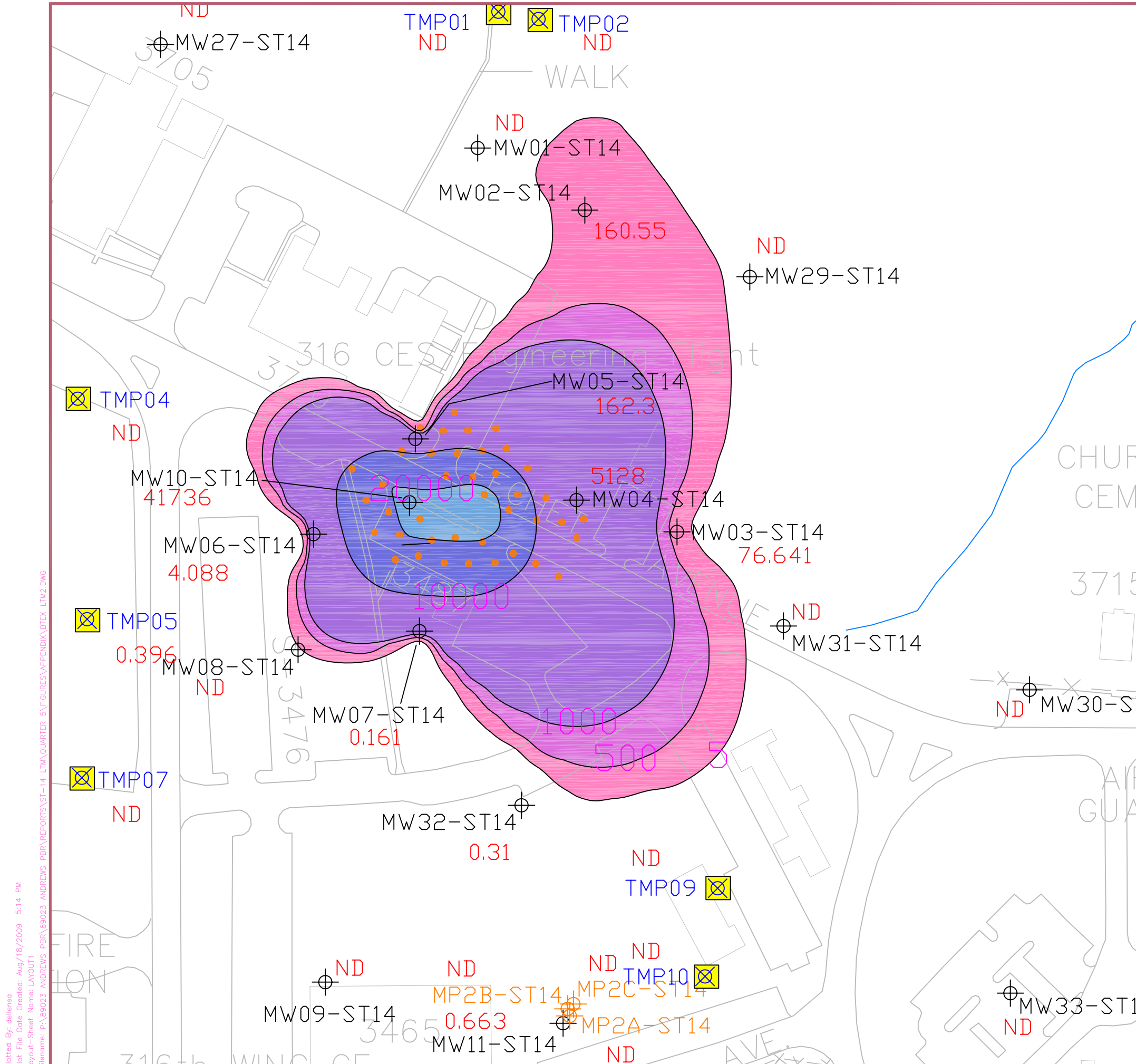


LEGEND

- MW03-ST14 MONITORING WELL
 - PermeX PLUS INJECTION POINT
 - 165.11 TOTAL BTEX CONCENTRATION IN ug/L, APRIL 2008
 - 5-500 ug/L BTEX
 - 500-1000 ug/L BTEX
 - 1000-5,000 ug/L BTEX
 - 5,000+ ug/L BTEX
- NOTES:**
- ND = Non Detect. BTEX compounds were not detected in the sample from this location.
- Total BTEX is the sum of benzene, toluene, ethylbenzene, m,p-xylenes and o-xylenes.
- PermeX Plus injections were performed in October 2007.



 <small>675 N. Washington St, Suite 300 Camp Springs, MD 21044 T 703.549.8728 F 703.549.9134 WWW.AECOM.COM</small>	Andrews AFB ST-14 Performance Monitoring Camp Springs, MD BTEX Isoconcentration Contours - April 2008
PROJECT START DATE (M/Y) June 2005	PROJECT NO. 89023
FILENAME BTEX LTM1.dwg	SHEET NO.
DRAWING NO.	DRN CHK DATE (MD/Y)



LEGEND

MW03-ST14 MONITORING WELL

MP3C-ST14 PDS INJECTION OR MONITORING POINT

● Permeameter PLUS INJECTION POINT

165.11 TOTAL BTEX CONCENTRATION IN ug/L, JULY 2008

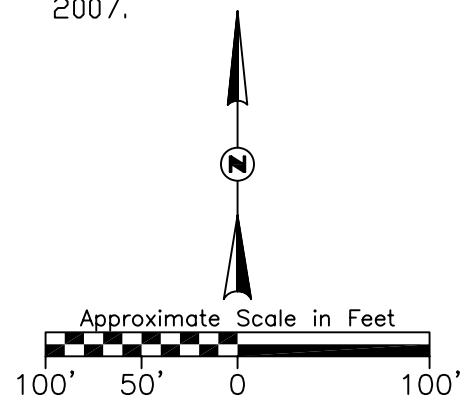
- 5-500 ug/L BTEX
- 500-1000 ug/L BTEX
- 1000-10,000 ug/L BTEX
- 10,000-20,000 ug/L BTEX
- 20,000+ ug/L BTEX

NOTES:

ND = Non Detect. BTEX compounds were not detected in the sample from this location.

Total BTEX is the sum of benzene, toluene, ethylbenzene, m,p-xylenes and o-xylenes.

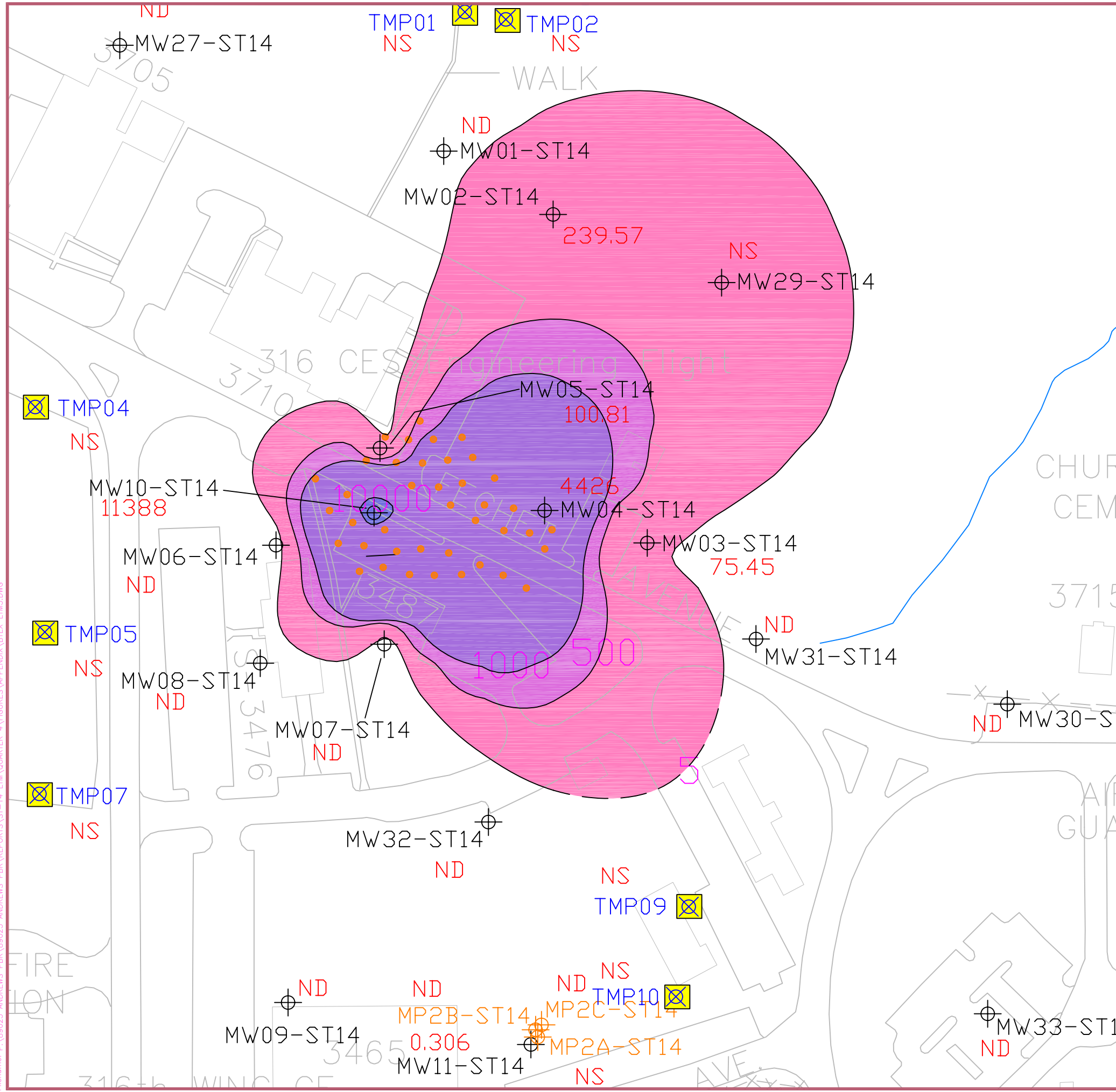
Permeameter Plus injections were performed in October 2007.



Plotted By: dellensa
 Plot File Date Created: Aug/18/2009 5:14 PM
 Layout-Sheet Name: LAYOUT1
 Filename: P:\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 5\FIGURES\APPENDIX\BTEX LTM2.DWG

<p style="font-size: 8px;">675 N. Washington St, Suite 300 Camp Springs, MD 21044 T 703.549.9728 F 703.549.9134 WWW.AECOM.COM</p>	<p>Andrews AFB ST-14 Performance Monitoring Camp Springs, MD</p> <p>BTEX Isoconcentration Contours - July 2008</p>
<p>PROJECT START DATE (M/Y) June 2005</p> <p>PROJECT NO. 89023</p> <p>FILENAME BTEX LTM2.dwg</p> <p>SHEET NO.</p> <p>DRAWING NO.</p>	
<p>DRN BY: DES BY: CHK BY: APP BY: </p>	<p>REV DESCRIPTION DRN CHK DATE (M/D/Y)</p>

Plotted By: amanda.dellens
 Plot File Date Created: Mar/09/2009 1:50 PM
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LEGEND

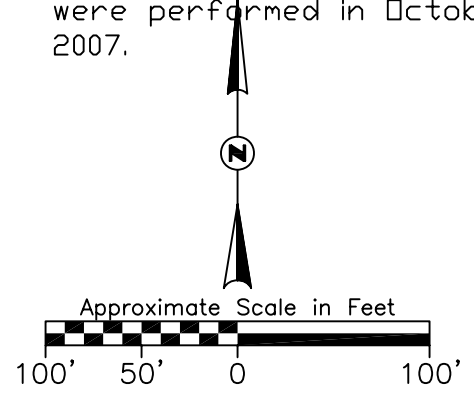
- MW03-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- Permeameter PLUS INJECTION POINT
- 165.11 TOTAL BTEX CONCENTRATION IN ug/L, OCTOBER 2008
- 5-500 ug/L BTEX
- 500-1000 ug/L BTEX
- 1000-10,000 ug/L BTEX
- 10,000+ ug/L BTEX
- PROJECTED CONTOUR (LIMITED DATA)

NOTES:

ND = Non Detect. BTEX compounds were not detected in the sample from this location.

Total BTEX is the sum of benzene, toluene, ethylbenzene, m,p-xylenes and o-xylenes.

Permeameter Plus injections were performed in October 2007.



REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

AECOM

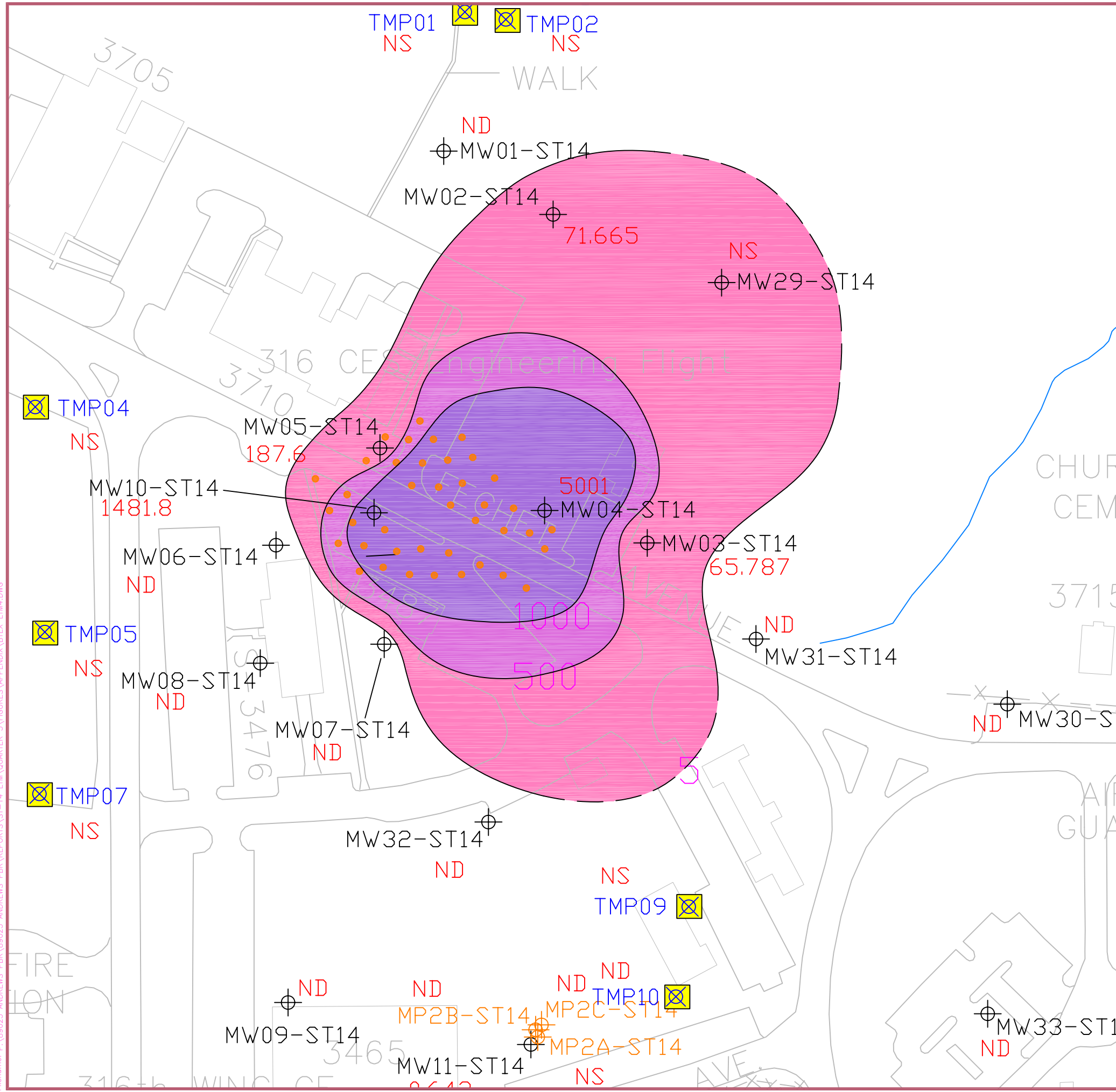
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BTEX Isoconcentration Contours - October 2008

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	BTEX LTM3.dwg
SHEET NO.	
DRAWING NO.	

Plotted By: amanda.dellens
 Plot File Date Created: Mar/09/2009 1:52 PM
 Layout-Sheet Name: LAYOUT1
 Filename: P:\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 5\FIGURES\APPENDIX\BTEX LTM4.DWG



LEGEND

MW03-ST14 MONITORING WELL

MP3C-ST14 PDS INJECTION OR MONITORING POINT

Permeameter PLUS INJECTION POINT

165.11 TOTAL BTEX CONCENTRATION IN ug/L, JANUARY 2009

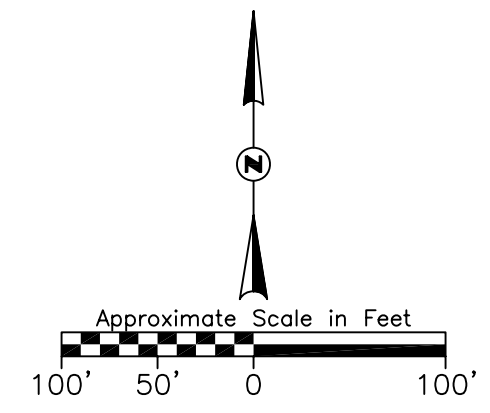
- 5-500 ug/L BTEX
- 500-1000 ug/L BTEX
- 1000+ ug/L BTEX
- PROJECTED CONTOUR (LIMITED DATA)

NOTES:

ND = Non Detect. BTEX compounds were not detected in the sample from this location.

Total BTEX is the sum of benzene, toluene, ethylbenzene, m,p-xylenes and o-xylenes.

Permeameter Plus injections were performed in October 2007.



REV	DESCRIPTION	DRN	CHK	DATE (MM/YY)

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BTEX Isoconcentration Contours - January 2009

PROJECT START DATE (M/Y)
 June 2005

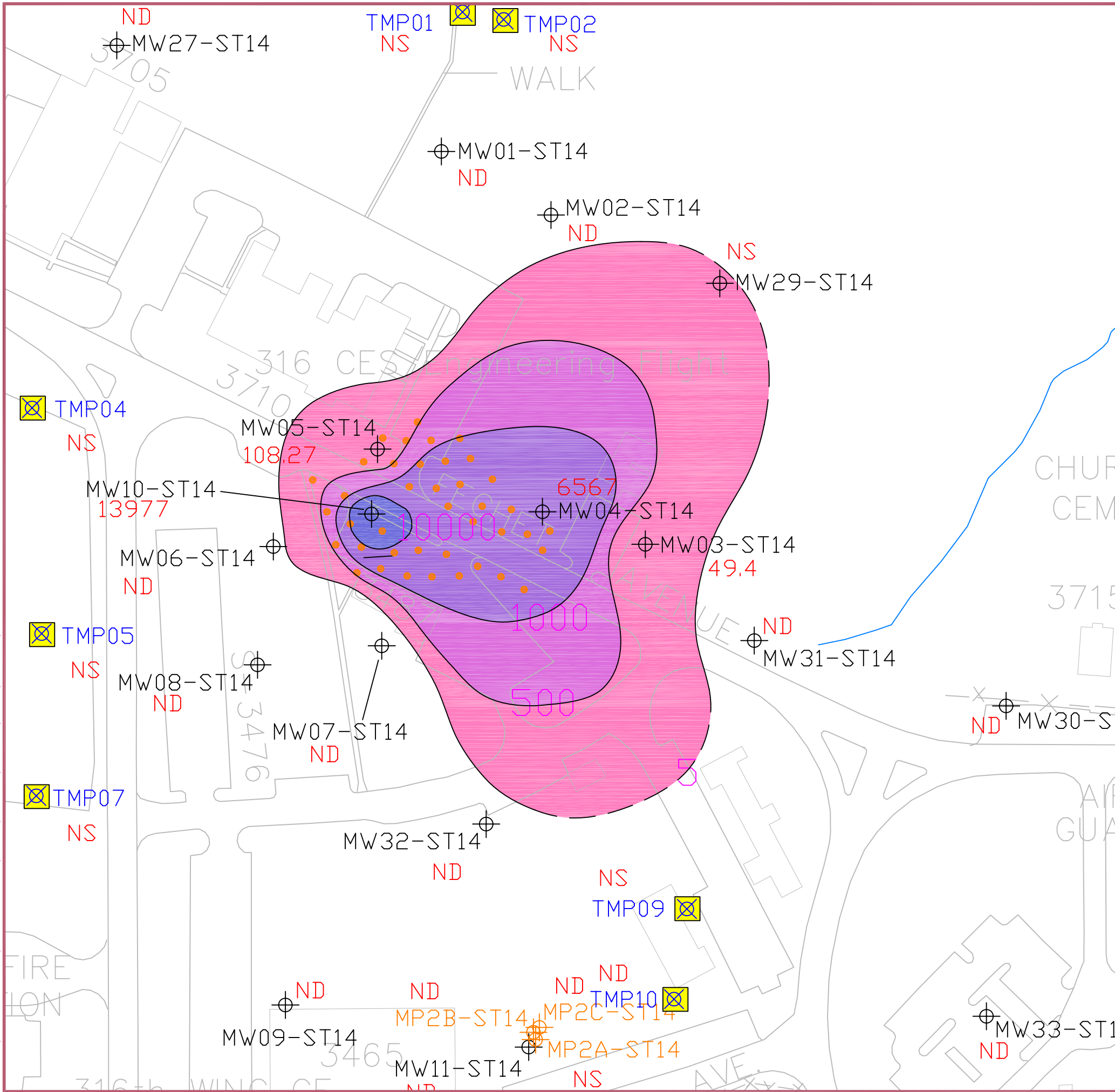
PROJECT NO.
 89023

FILENAME
 BTEX LTM4.dwg

SHEET NO.

DRAWING NO.

Plotted By: dellensa
 Plot File Date Created: Sep/09/2009 7:15 PM
 Layout-Sheet Name: LAYOUT1
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LEGEND

- MW03-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- Permeameter PLUS INJECTION POINT
- 165.11 TOTAL BTEX CONCENTRATION IN ug/L, APRIL 2009

- 5-500 ug/L BTEX
- 500-1000 ug/L BTEX
- 1000-10000 ug/L BTEX
- 10000+ ug/L BTEX

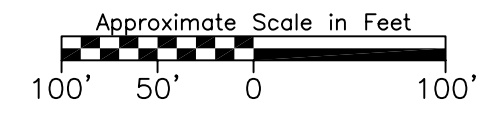
PROJECTED CONTOUR (LIMITED DATA)

NOTES:

ND = Non Detect. BTEX compounds were not detected in the sample from this location.

Total BTEX is the sum of benzene, toluene, ethylbenzene, m,p-xylenes and o-xylenes.

Permeameter Plus injections were performed in October 2007.



REV	DESCRIPTION	DRN	CHK	DATE (MM/YY)

AECOM

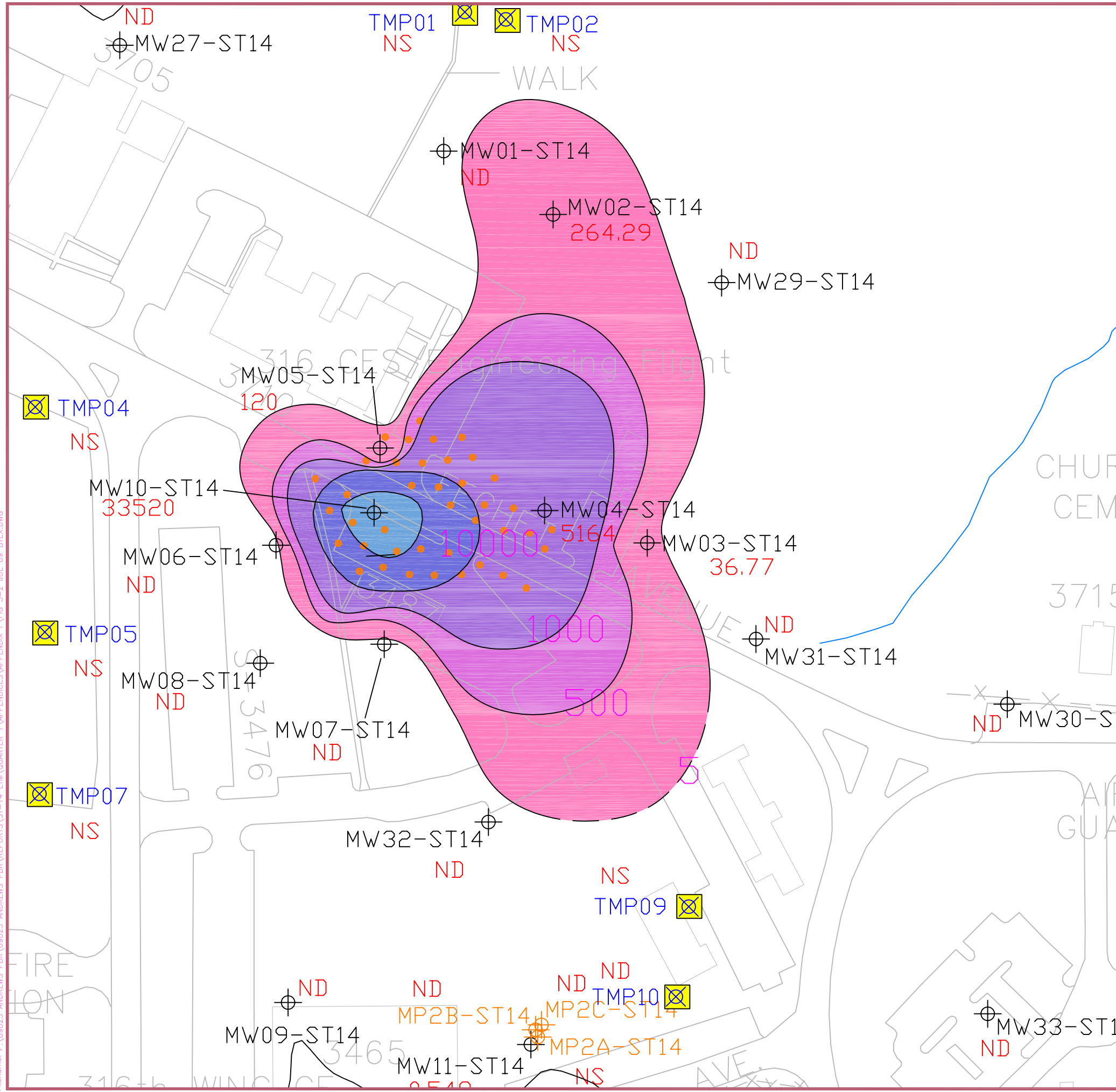
675 N. Washington St., Suite 300
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BTEX Isoconcentration Contours - April 2009

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	BTEX LTM 5.dwg
SHEET NO.	
DRAWING NO.	

Plotted By: mrcallyad
 Plot File Date Created: Dec/09/2009 12:55 PM
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LEGEND

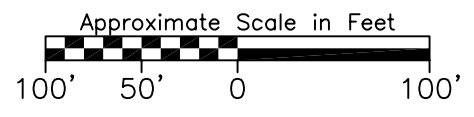
- MW03-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- Permeameter PLUS INJECTION POINT
- 165.11 TOTAL BTEX CONCENTRATION IN ug/L, JULY 2009
- 5-500 ug/L BTEX
- 500-1000 ug/L BTEX
- 1000-10000 ug/L BTEX
- 10000-20000 ug/L BTEX
- 20000+ ug/L BTEX
- PROJECTED CONTOUR (LIMITED DATA)

NOTES:

ND = Non Detect. BTEX compounds were not detected in the sample from this location.

Total BTEX is the sum of benzene, toluene, ethylbenzene, m,p-xylenes and o-xylenes.

Permeameter Plus injections were performed in October 2007 and July 2009.



REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

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BTEX Isoconcentration Contours - July 2009

PROJECT START DATE (M/Y)
June 2005

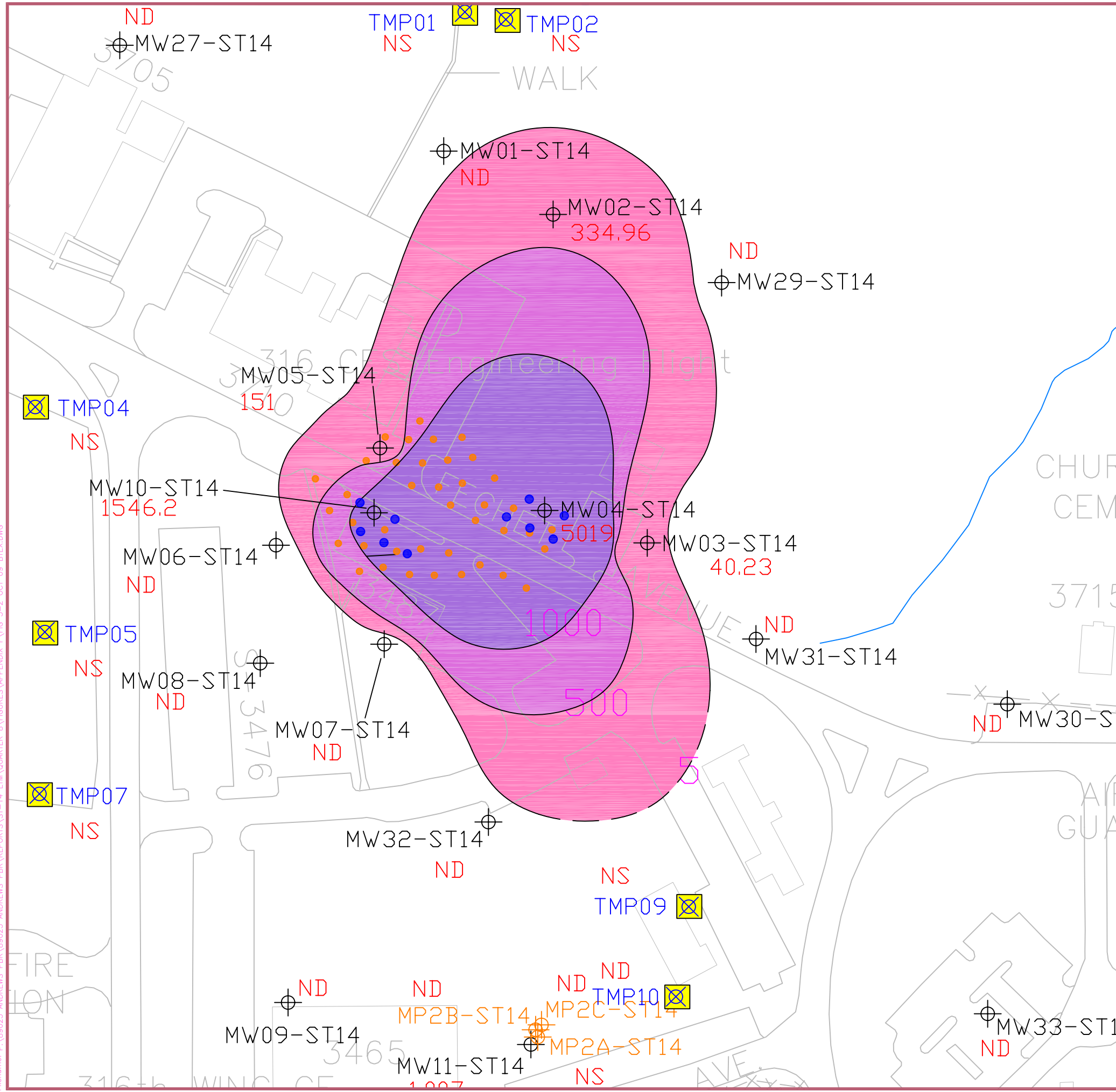
PROJECT NO.
89023

FILENAME
Fig 5-2 Jul 09 BTEX.dwg

SHEET NO.

DRAWING NO.

Plotted By: mrcallyad
 Plot File Date Created: Jun/16/2010 12:35 PM
 Layout-Sheet Name: LAYOUT1
 Filename: P:\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 8\FIGURES\APPENDIX F\FIG 5-2 OCT 09 BTEX.DWG

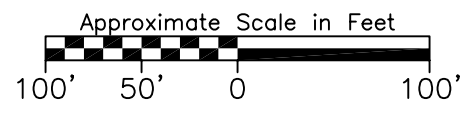


LEGEND

- MW03-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- Permeameter PLUS INJECTION POINT, OCTOBER 2007
- Permeameter PLUS INJECTION POINT, JULY 2009
- 165.11 TOTAL BTEX CONCENTRATION IN ug/L, OCTOBER 2009

- 5-500 ug/L BTEX
- 500-1000 ug/L BTEX
- 1000+ ug/L BTEX
- PROJECTED CONTOUR (LIMITED DATA)

NOTES:
 ND = Non Detect
 NS = Not Sampled
 PDS = Pre-Design Study
 Total BTEX is the sum of benzene, toluene, ethylbenzene, m,p-xylenes and o-xylenes.



DRN	DES BY:	CHK BY:	APP BY:	REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

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BTEX Isoconcentration Contours - October 2009

PROJECT START DATE (M/Y)
 June 2005

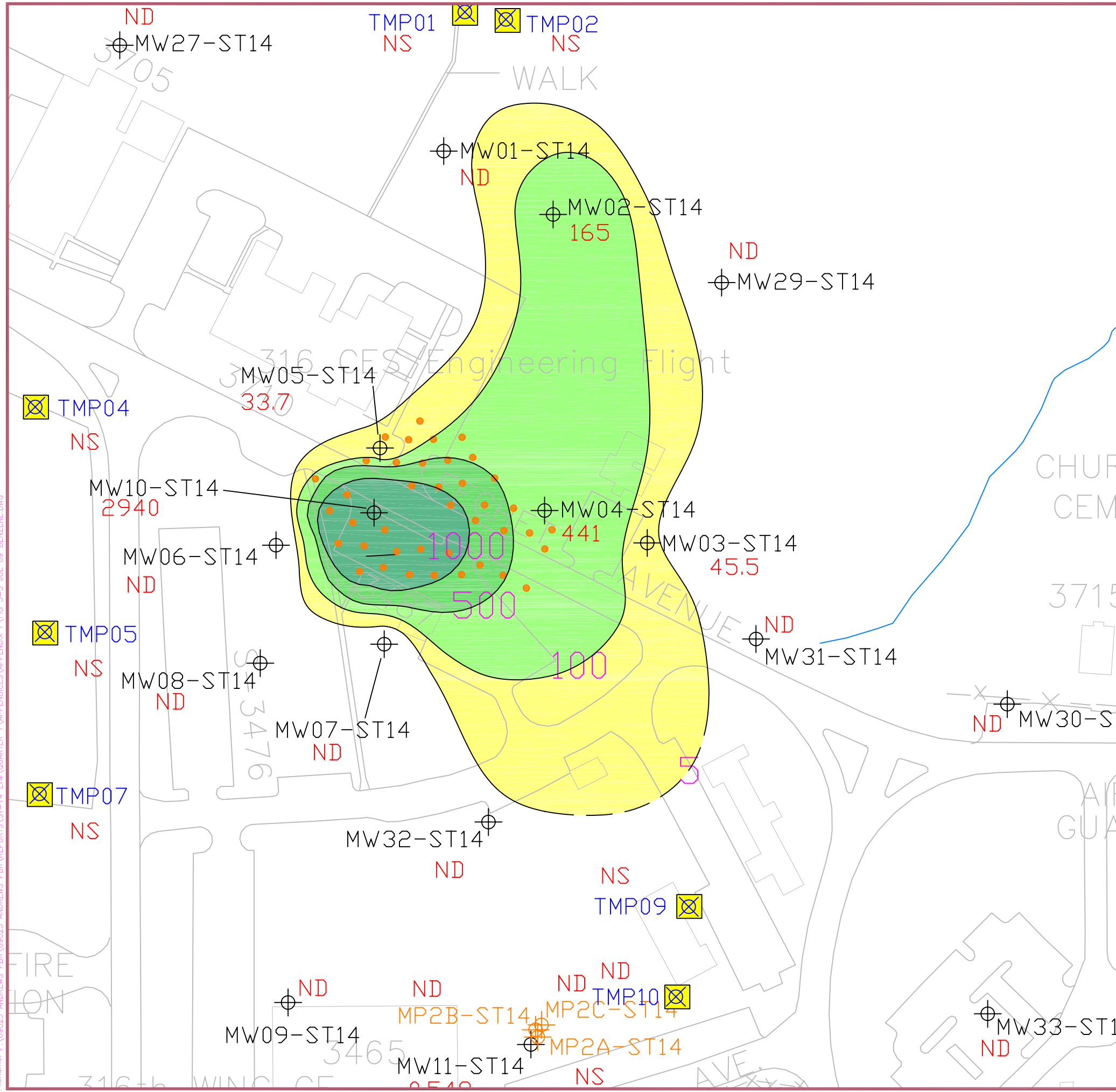
PROJECT NO.
 89023

FILENAME
 Fig 5-2 Oct 09 BTEX.dwg

SHEET NO.

DRAWING NO.

Plotted By: mrcallyad
 Plot File Date Created: Dec/09/2009 12:55 PM
 Layout-Sheet Name: LAYOUT1
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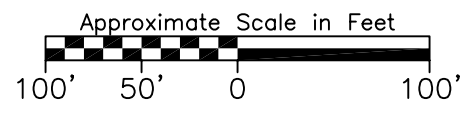


LEGEND

- MW03-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- Permeameter PLUS INJECTION POINT
- 165.11 BENZENE CONCENTRATION IN ug/L, JULY 2009
- 5-100 ug/L BENZENE
- 100-500 ug/L BENZENE
- 500-1000 ug/L BENZENE
- 1000+ ug/L BENZENE
- PROJECTED CONTOUR (LIMITED DATA)

NOTES:

ND = Non Detect
 NS = Not Sampled
 Permeameter Plus injections were performed in October 2007 and July 2009.



REV	DESCRIPTION	DRN	CHK	DATE (M/D/Y)

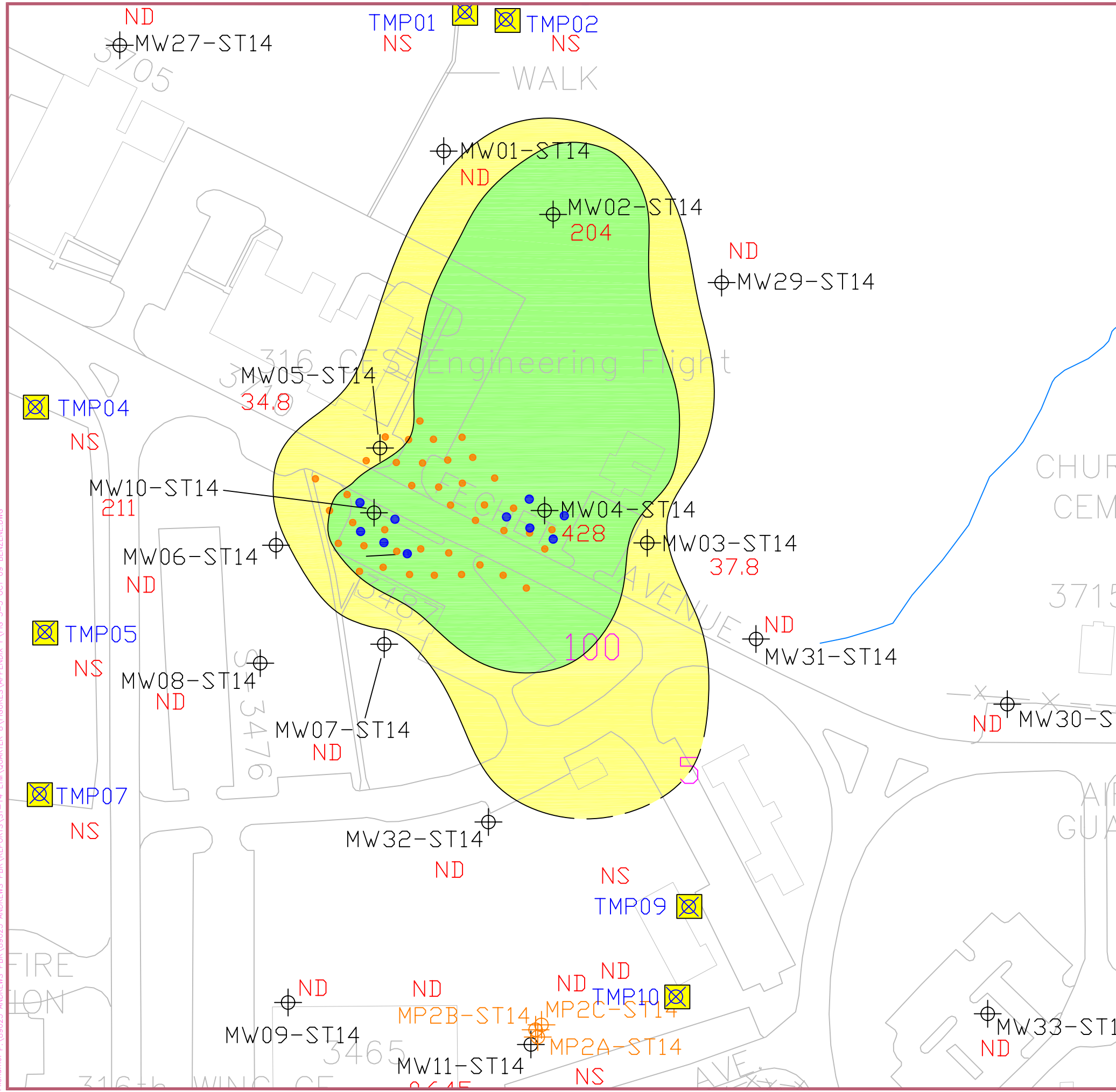
AECOM
 675 N. Washington St., Suite 300
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 WWW.AECOM.COM

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Benzene Isoconcentration Contours - July 2009

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	Fig 5-3 Jul 09 Benzene.dwg
SHEET NO.	
DRAWING NO.	

Plotted By: mrcallyad
 Plot File Date Created: Jun/16/2010 11:18 AM
 Layout-Sheet Name: LAYOUT1
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LEGEND

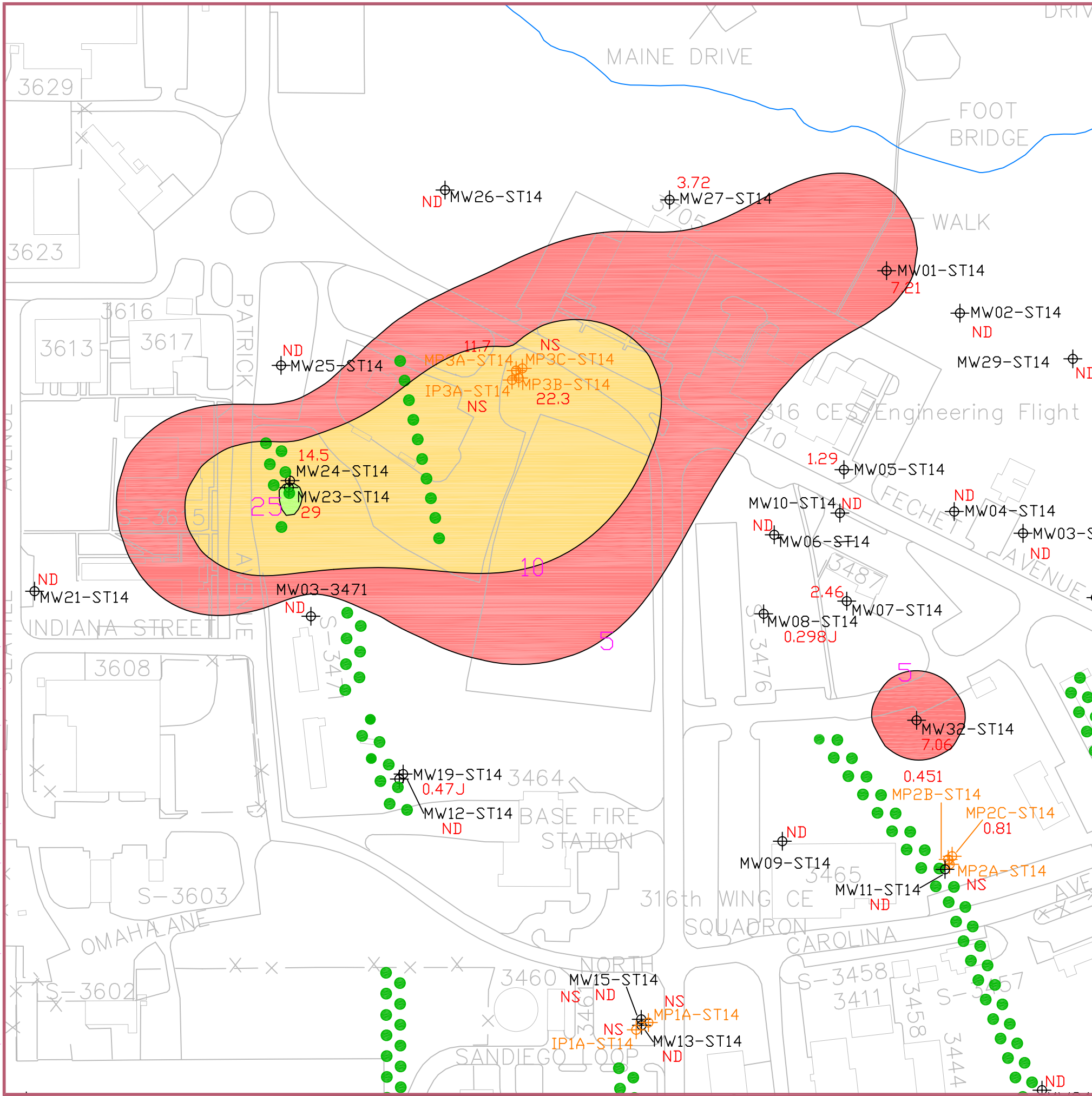
- MW03-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- PermeOx PLUS INJECTION POINT, OCTOBER 2007
- PermeOx PLUS INJECTION POINT, JULY 2009
- 165.11 BENZENE CONCENTRATION IN ug/L, OCTOBER 2009
- 5-100 ug/L BENZENE
- 100+ ug/L BENZENE
- PROJECTED CONTOUR (LIMITED DATA)

NOTES:
 ND = Non Detect
 NS = Not Sampled
 PDS = Pre-Design Study



 <small>675 N. Washington St. Suite 300 44001 Cleveland, OH 44130 T 703.549.8728 F 703.549.9134 WWW.AECOM.COM</small>	<p style="text-align: center;">Andrews AFB ST-14 Long-Term Monitoring Camp Springs, MD</p> <p style="text-align: center;">Benzene Isoconcentration Contours - October 2009</p>
PROJECT START DATE (M/Y) June 2005 PROJECT NO. 89023 FILENAME Fig 5-3 Oct 09 Benzene.dwg SHEET NO. DRAWING NO.	VERIFY SCALE IF PLAN SHEET IS REDUCED 1-INCH = 100-FOOT DRN: _____ CHK: _____ DES BY: _____ APP BY: _____ REV: _____ DESCRIPTION: _____ DRN: _____ CHK: _____ DATE (M/D/Y)

Plotted By: dellensa
 Plot File Date Created: Aug/18/2009 5:16 PM
 Layout-Sheet Name: LAYOUT1
 Filename: P:\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 5\FIGURES\APPENDIX CT 032006.DWG

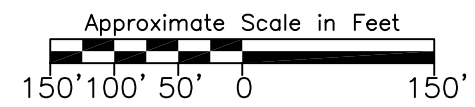


LEGEND

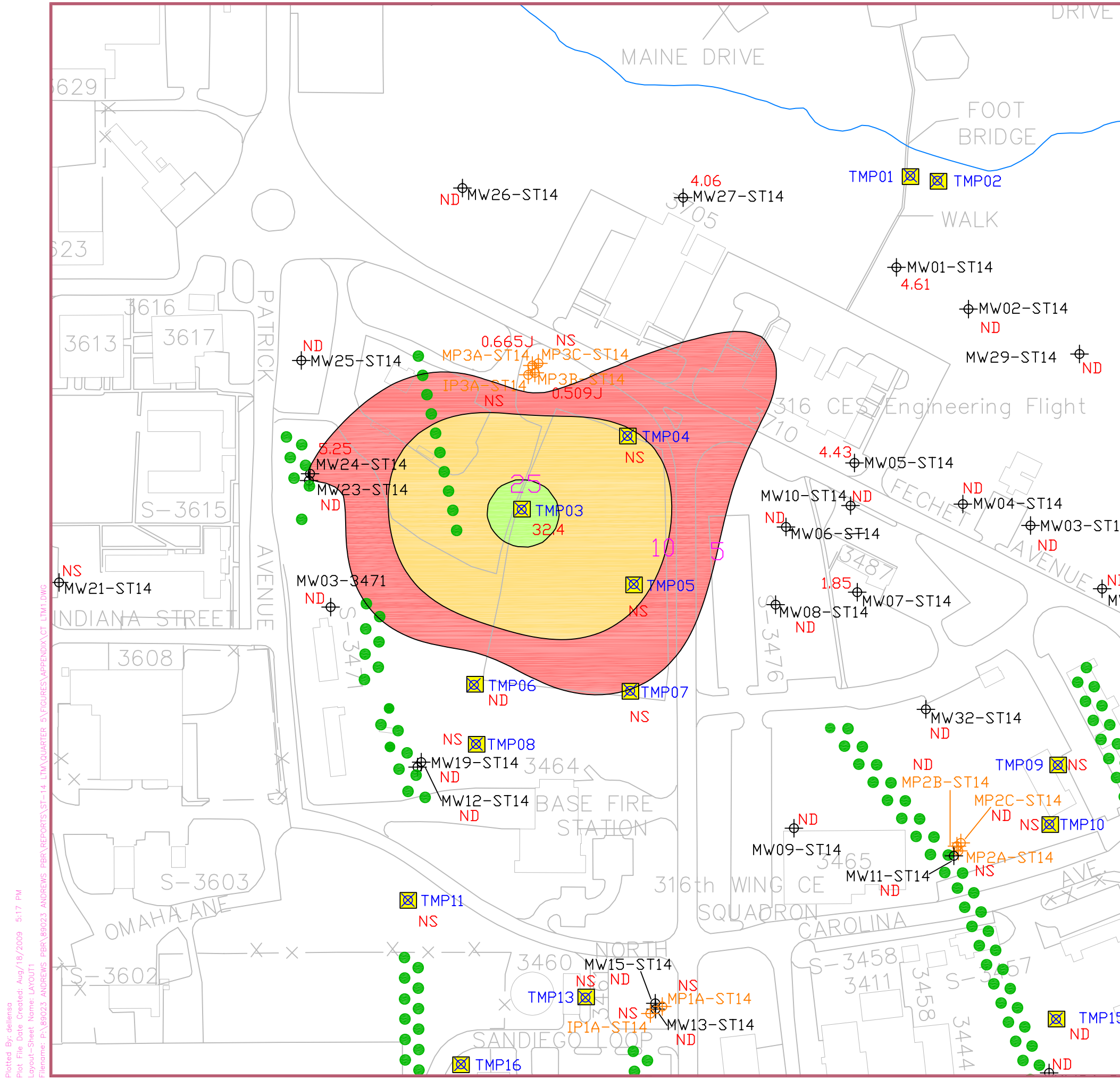
- MW26-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- SODIUM LACTATE INJECTION POINT
- 29 CARBON TETRACHLORIDE CONCENTRATION IN ug/L, MARCH 2006
- 5-10 ug/L CARBON TETRACHLORIDE
- 10-25 ug/L CARBON TETRACHLORIDE
- 25+ ug/L CARBON TETRACHLORIDE

NOTES:

ND = Non Detect.
 PDS = Pre-Design Study
 Sodium lactate injection points installed August-October 2007.



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PROJECT START DATE (M/Y) June 2005	PROJECT NO. 89023
FILENAME CT 032006.dwg	SHEET NO.
DRAWING NO.	DESCRIPTION



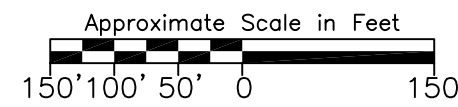
- ### LEGEND
- MW26-ST14 MONITORING WELL
 - MP3C-ST14 PDS INJECTION OR MONITORING POINT
 - SODIUM LACTATE INJECTION POINT
 - TMP11 TEMPORARY MONITORING POINT
 - 29 CARBON TETRACHLORIDE CONCENTRATION IN ug/L, APRIL 2008.
 - 5-10 ug/L CARBON TETRACHLORIDE
 - 10-25 ug/L CARBON TETRACHLORIDE
 - 25+ ug/L CARBON TETRACHLORIDE

NOTES:

ND = Non Detect

NS = Not Sampled.

PDS = Pre-Design Study



Plotted By: dellensa
 Plot File Date Created: Aug/18/2009 5:17 PM
 Layout-Sheet Name: LAYOUT1
 Filename: P:\89023 ANDREWS PBR\REPORTS\ST-14 LTM\QUARTER 5\FIGURES\APPENDIX CT LTM1.DWG

NO.	REV	DESCRIPTION	DRN	CHK	DATE (MM/YY)

AECOM

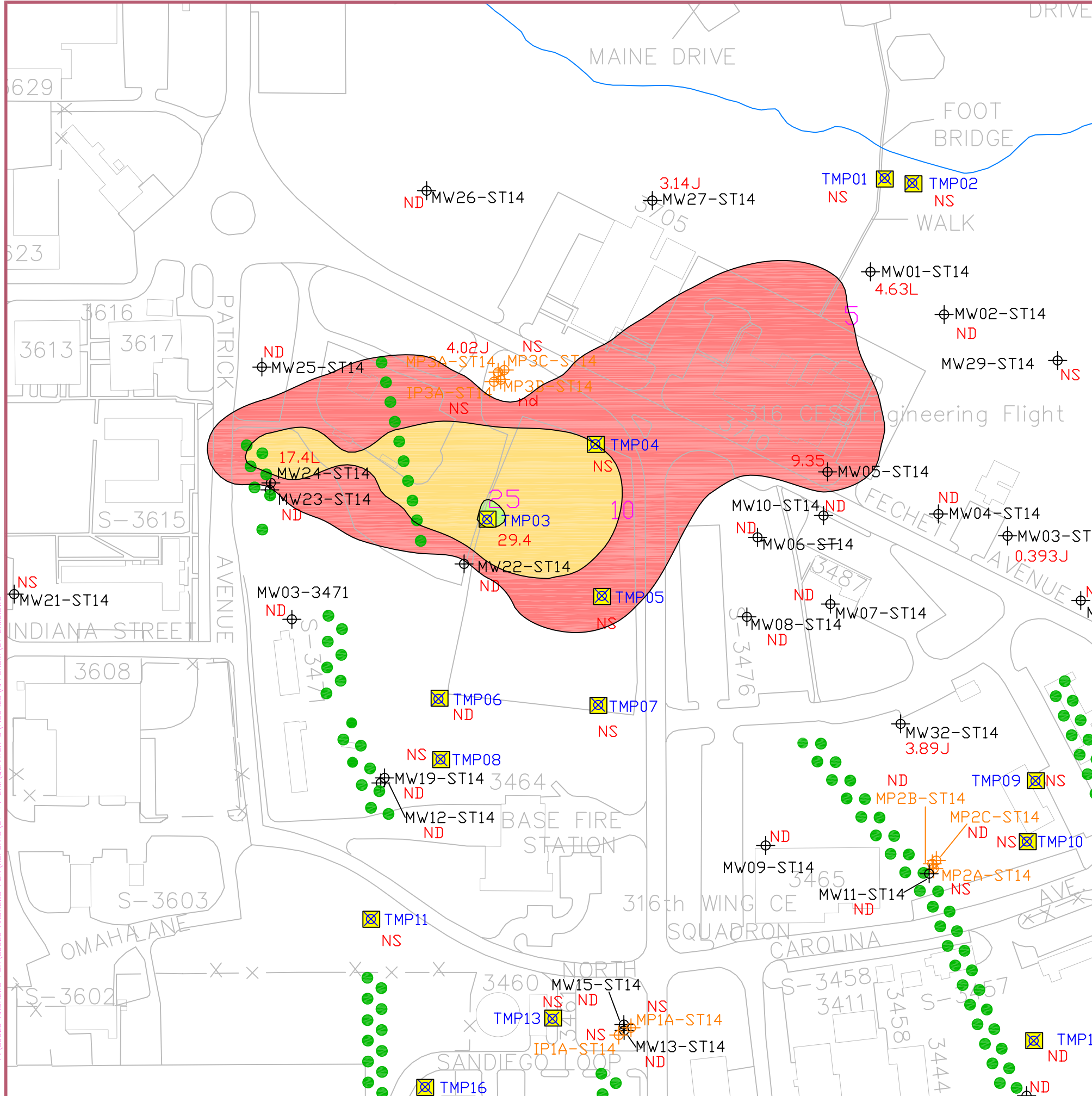
675 N. Washington St. Suite 300
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CT Isoconcentration Contours - April 2008

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	CT LTM1.dwg
SHEET NO.	
DRAWING NO.	

Plotted By: dellensa
 Plot File Date Created: Aug/18/2009 5:20 PM
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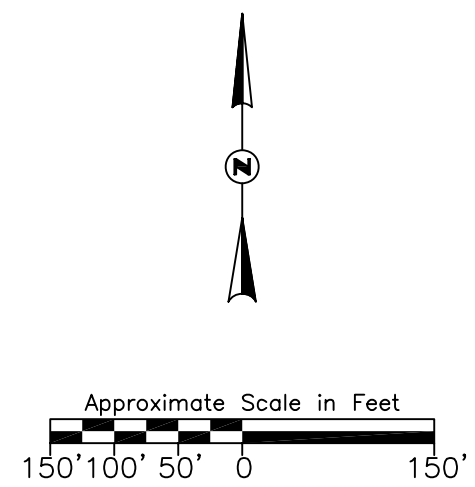


LEGEND

- MW26-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- SODIUM LACTATE INJECTION POINT
- TMP11 TEMPORARY MONITORING POINT
- 29 CARBON TETRACHLORIDE CONCENTRATION IN ug/L, OCTOBER 2008.
- 5-10 ug/L CARBON TETRACHLORIDE
- 10-25 ug/L CARBON TETRACHLORIDE
- 25+ ug/L CARBON TETRACHLORIDE

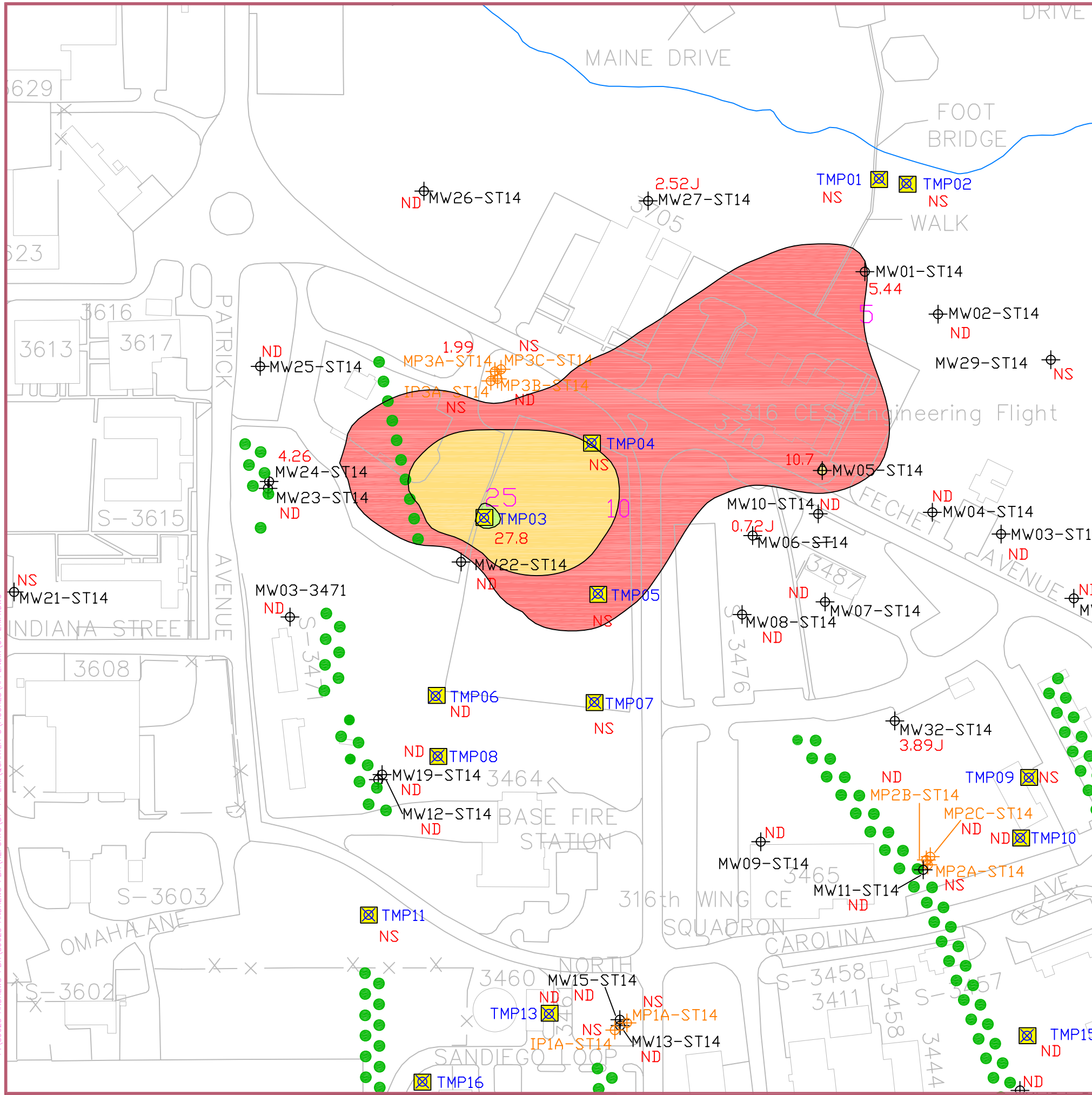
NOTES:

- ND = Non Detect
- NS = Not Sampled.
- PDS = Pre-Design Study



DRN	1	DESIGN	DESCRIPTION	REV	DATE (M/D/Y)
	2	CHK		REV	CHK
	3	APP		REV	APP
AECOM 675 N. Washington St., Suite 300 Camp Springs, MD 20746 T: 703.549.8728 F: 703.549.9134 WWW.AECOM.COM					
Andrews AFB ST-14 Performance Monitoring Camp Springs, MD CT Isoconcentration Contours - October 2008					
PROJECT START DATE (M/Y)		June 2005			
PROJECT NO.		89023			
FILENAME		CT LTM3.dwg			
SHEET NO.					
DRAWING NO.					

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Plot File Date Created: Aug/18/2009 5:33 PM
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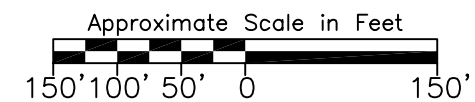


LEGEND

- MW26-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- SODIUM LACTATE INJECTION POINT
- TMP11 TEMPORARY MONITORING POINT
- 29** CARBON TETRACHLORIDE CONCENTRATION IN ug/L, JANUARY 2009.
- 5-10 ug/L CARBON TETRACHLORIDE
- 10-25 ug/L CARBON TETRACHLORIDE
- 25+ ug/L CARBON TETRACHLORIDE

NOTES:

- ND = Non Detect
- NS = Not Sampled.
- PDS = Pre-Design Study



DRN	CHK	DATE (M/D/Y)

REV	DESCRIPTION

AECOM

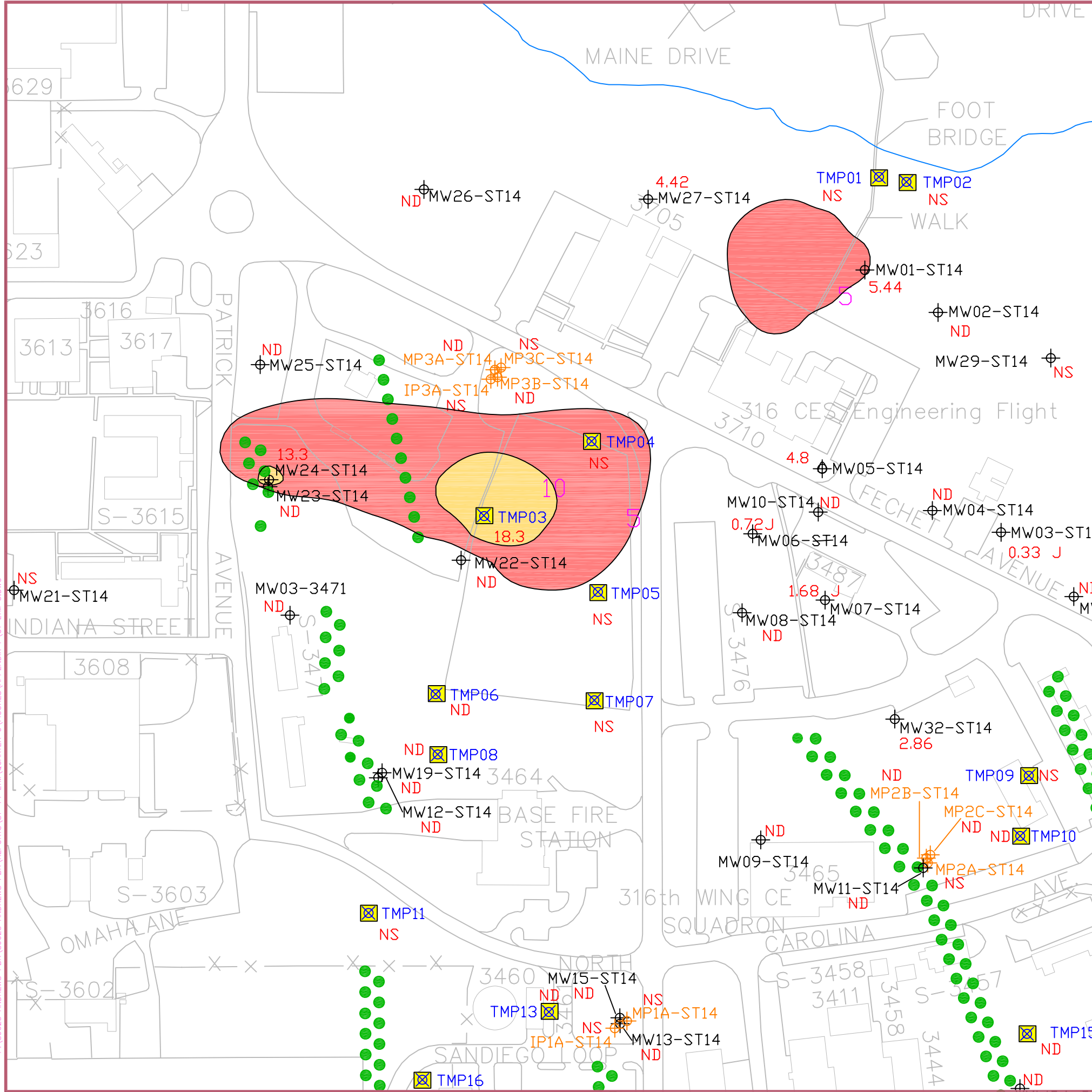
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Camp Springs, MD 20746
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WWW.AECOM.COM

**Andrews AFB
ST-14 Performance Monitoring
Camp Springs, MD**








CT Isoconcentration Contours - January 2009

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	CT LTM4.dwg
SHEET NO.	
DRAWING NO.	

Plotted By: dellensa
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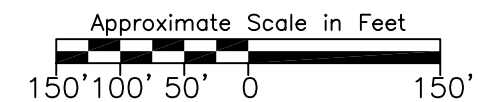


LEGEND

- MW26-ST14  MONITORING WELL
- MP3C-ST14  PDS INJECTION OR MONITORING POINT
-  SODIUM LACTATE INJECTION POINT
- TMP11  TEMPORARY MONITORING POINT
- 29  CARBON TETRACHLORIDE CONCENTRATION IN ug/L, APRIL 2009.
-  5-10 ug/L CARBON TETRACHLORIDE
-  10+ ug/L CARBON TETRACHLORIDE

NOTES:

- ND = Non Detect
- NS = Not Sampled.
- PDS = Pre-Design Study



NO.	REV.	DESCRIPTION	DRN	CHK	DATE (MM/YY)

VERIFY SCALE IF PLAN SHEET IS REDUCED
 1-INCH

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ST-14 Performance Monitoring
Camp Springs, MD

CT Isoconcentration Contours - April 2009

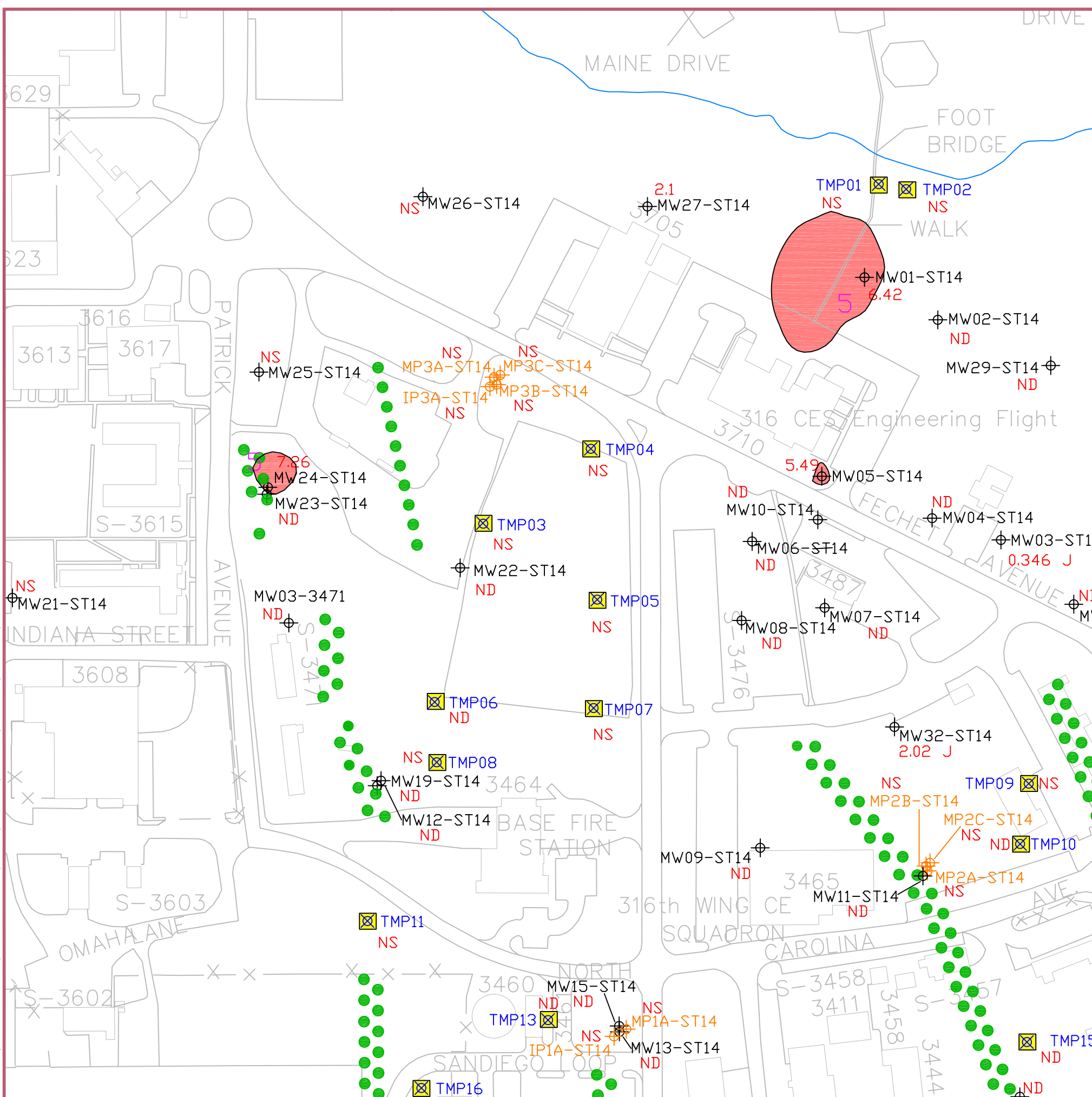
PROJECT START DATE (M/Y)
 June 2005

PROJECT NO.
 89023

FILENAME
 CT LTM 5.dwg

SHEET NO.

DRAWING NO.

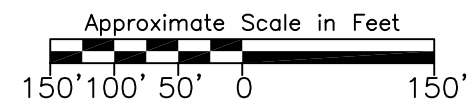


LEGEND

- MW26-ST14 ◉ MONITORING WELL
- MP3C-ST14 ◉ PDS INJECTION OR MONITORING POINT
- SODIUM LACTATE INJECTION POINT
- ◓ TMP11 TEMPORARY MONITORING POINT
- 29 CARBON TETRACHLORIDE CONCENTRATION IN ug/L, JULY 2009.
- 5-10 ug/L CARBON TETRACHLORIDE

NOTES:

- ND = Non Detect
- NS = Not Sampled.
- PDS = Pre-Design Study



DRN	CHK	DATE (MD/Y)

675 N. Washington St, Suite 300
 440 W. Market Street, 20th Fl.
 Tallahassee, FL 32310
 TEL: 904.438.9728 FAX: 904.438.9134
 WWW.AECOM.COM

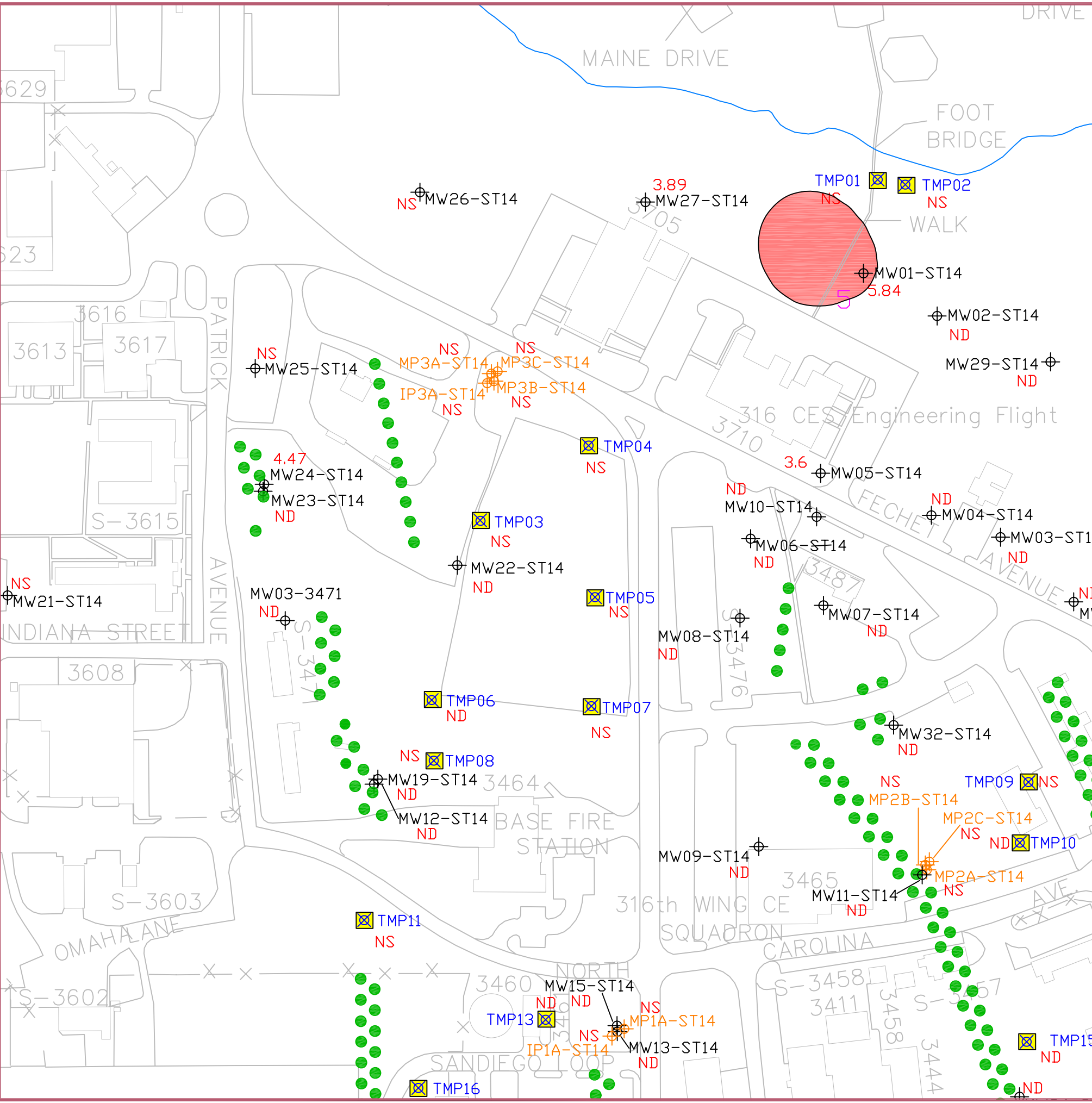
Andrews AFB
ST-14 Performance Monitoring
Camp Springs, MD

CT Isoconcentration Contours - July 2009

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	Fig 5-4 Jul 09 CT.dwg
SHEET NO.	
DRAWING NO.	

Plotted By: mcnallyad
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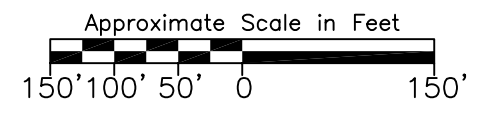
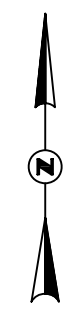
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LEGEND

- MW26-ST14 MONITORING WELL
- MP3C-ST14 PDS INJECTION OR MONITORING POINT
- SODIUM LACTATE INJECTION POINT
- TMP11 TEMPORARY MONITORING POINT
- 29 CARBON TETRACHLORIDE CONCENTRATION IN ug/L, OCTOBER 2009.
- 5-10 ug/L CARBON TETRACHLORIDE

NOTES:
 ND = Non Detect
 NS = Not Sampled
 PDS = Pre-Design Study



DRN	CHK	DATE (MM/YY)

APP BY:	REV	DESCRIPTION

675 N. Washington St., Suite 300
 44000 Washington Ave., 2nd Fl.
 T: 703.549.9728 F: 703.549.9134
 WWW.AECOM.COM

Andrews AFB
ST-14 Long-Term Monitoring
Camp Springs, MD

CT Isoconcentration Contours - October 2009

PROJECT START DATE (M/Y)	June 2005
PROJECT NO.	89023
FILENAME	Fig 5-4 Oct 09 CT.dwg
SHEET NO.	
DRAWING NO.	

APPENDIX G
MANN-KENDALL ANALYSIS RESULTS
SUMMARY (TCE, BTEX, AND CT)

MAROS Mann-Kendall Statistics Summary

Project: Andrews AFB ST-14

User Name: McNally

Location: Andrews AFB

State: Maryland

Time Period: 2/27/2006 to 4/5/2010

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
TRICHLOROETHYLENE (TCE)								
MW19-ST14	S	10	9	1.04	-41	100.0%	No	D
MW11-ST14	S	14	13	1.41	-81	100.0%	No	D
MW12-ST14	S	10	10	0.91	-34	100.0%	No	D
MW13-ST14	S	14	13	1.84	-69	100.0%	No	D
MW15-ST14	S	14	14	1.63	-53	99.8%	No	D
MW17-ST14	S	10	5	1.42	-29	99.5%	No	D
MW03-3471	T	9	1	0.31	-2	54.0%	No	S
MW25-ST14	T	6	1	0.38	-3	64.0%	No	S
MW24-ST14	T	10	10	0.50	-37	100.0%	No	D
MW23-ST14	T	10	10	1.10	-23	97.7%	No	D
MW22-ST14	T	7	2	0.97	-9	88.1%	No	S
MW21-ST14	T	2	0	0.00	0	0.0%	Yes	N/A
MW27-ST14	T	9	9	0.55	10	82.1%	No	NT
MW18-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW29-ST14	T	6	0	0.00	0	42.3%	Yes	S
MW16-ST14	T	10	10	0.43	-11	81.0%	No	S
MW10-ST14	T	9	1	2.04	2	54.0%	No	NT
MW20-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW38-ST14	T	4	0	0.00	0	37.5%	Yes	S
ST14-MW08	T	9	7	1.98	-23	99.1%	No	D
ST14-MW07	T	10	10	1.17	-3	56.9%	No	NT
ST14-MW06	T	9	9	0.78	-13	89.0%	No	S
ST14-MW05	T	10	10	0.51	11	81.0%	No	NT
ST14-MW04	T	10	10	0.91	9	75.8%	No	NT
ST14-MW03	T	10	10	0.14	-19	94.6%	No	PD
MW26-ST14	T	6	1	0.53	-3	64.0%	No	S
ST14-MW01	T	9	9	0.50	4	61.9%	No	NT
ST14-MW09	T	10	4	1.05	-26	98.9%	No	D
MW37-ST14	T	10	10	0.44	15	89.2%	No	NT
MW35-ST14	T	10	10	0.40	3	56.9%	No	NT
MW34-ST14	T	10	9	0.60	-24	98.2%	No	D
MW33-ST14	T	10	10	0.22	-23	97.7%	No	D
MW32-ST14	T	10	8	0.73	14	87.3%	No	NT
MW31-ST14	T	9	8	0.78	8	76.2%	No	NT
MW30-ST14	T	9	0	0.00	0	46.0%	Yes	S
ST14-MW02	T	9	8	0.92	6	69.4%	No	NT

Project: Andrews AFB ST-14

User Name: McNally

Location: Andrews AFB

State: Maryland

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
TRICHLOROETHYLENE (TCE)								

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-
Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Mann-Kendall Statistics Summary

Project: Andrews AFB ST-14

User Name: McNally

Location: Andrews AFB

State: Maryland

Time Period: 2/27/2006 to 4/5/2010

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
BENZENE								
ST14-MW04	S	10	10	0.34	-37	100.0%	No	D
MW10-ST14	S	9	9	0.89	-4	61.9%	No	S
MW20-ST14	T	4	1	0.44	3	72.9%	No	NT
MW15-ST14	T	14	5	2.22	37	97.6%	No	I
ST14-MW01	T	9	0	0.00	0	46.0%	Yes	S
MW16-ST14	T	10	9	0.45	-9	75.8%	No	S
MW38-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW29-ST14	T	6	0	0.00	0	42.3%	Yes	S
MW17-ST14	T	10	9	2.21	-31	99.8%	No	D
MW35-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW18-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW34-ST14	T	10	10	0.21	-23	97.7%	No	D
MW33-ST14	T	10	0	0.00	0	46.4%	Yes	S
ST14-MW02	T	9	8	0.98	4	61.9%	No	NT
MW32-ST14	T	10	2	1.03	-11	81.0%	No	NT
MW37-ST14	T	10	6	0.78	-15	89.2%	No	S
MW31-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW30-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW21-ST14	T	2	0	0.00	0	0.0%	Yes	N/A
MW22-ST14	T	7	0	0.00	0	43.7%	Yes	S
MW03-3471	T	9	9	0.34	6	69.4%	No	NT
MW27-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW26-ST14	T	6	0	0.00	0	42.3%	Yes	S
MW23-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW25-ST14	T	6	0	0.00	0	42.3%	Yes	S
MW24-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW19-ST14	T	10	3	1.26	-8	72.9%	No	NT
MW11-ST14	T	14	9	0.82	27	92.1%	No	PI
ST14-MW06	T	9	1	0.45	-4	61.9%	No	S
ST14-MW08	T	9	1	0.38	-8	76.2%	No	S
ST14-MW07	T	10	4	0.95	-26	98.9%	No	D
ST14-MW05	T	10	10	0.41	-13	85.4%	No	S
MW12-ST14	T	10	1	0.58	-9	75.8%	No	S
ST14-MW09	T	10	0	0.00	0	46.4%	Yes	S
MW13-ST14	T	14	8	0.61	16	79.1%	No	NT
ST14-MW03	T	10	10	0.56	-43	100.0%	No	D

ETHYLBENZENE

Project: Andrews AFB ST-14

User Name: McNally

Location: Andrews AFB

State: Maryland

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
ETHYLBENZENE								
MW10-ST14	S	9	9	1.06	-2	54.0%	No	NT
ST14-MW04	S	10	10	0.19	-10	78.4%	No	S
MW11-ST14	T	14	0	0.00	0	47.8%	Yes	S
MW37-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW19-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW20-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW30-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW31-ST14	T	9	0	0.00	0	46.0%	Yes	S
ST14-MW07	T	10	0	0.00	0	46.4%	Yes	S
MW29-ST14	T	6	0	0.00	0	42.3%	Yes	S
ST14-MW06	T	9	0	0.00	0	46.0%	Yes	S
MW27-ST14	T	9	0	0.00	0	46.0%	Yes	S
ST14-MW08	T	9	0	0.00	0	46.0%	Yes	S
MW22-ST14	T	7	0	0.00	0	43.7%	Yes	S
MW26-ST14	T	6	0	0.00	0	42.3%	Yes	S
MW23-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW25-ST14	T	6	0	0.00	0	42.3%	Yes	S
ST14-MW09	T	9	0	0.00	0	46.0%	Yes	S
MW03-3471	T	9	9	0.55	-14	91.0%	No	PD
MW21-ST14	T	2	0	0.00	0	0.0%	Yes	N/A
ST14-MW03	T	10	10	0.50	-35	100.0%	No	D
MW38-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW32-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW15-ST14	T	14	0	0.00	0	47.8%	Yes	S
MW33-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW12-ST14	T	10	0	0.00	0	46.4%	Yes	S
ST14-MW01	T	9	0	0.00	0	46.0%	Yes	S
MW17-ST14	T	10	3	3.06	-14	87.3%	No	NT
MW16-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW35-ST14	T	10	0	0.00	0	46.4%	Yes	S
ST14-MW05	T	10	10	0.38	-3	56.9%	No	S
ST14-MW02	T	9	7	1.18	7	72.8%	No	NT
MW34-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW18-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW13-ST14	T	14	0	0.00	0	47.8%	Yes	S
MW24-ST14	T	10	0	0.00	0	46.4%	Yes	S
TOLUENE								
MW10-ST14	S	9	9	0.93	-2	54.0%	No	S
ST14-MW04	S	10	10	0.34	-21	96.4%	No	D
MW13-ST14	T	14	0	0.00	0	47.8%	Yes	S
MW23-ST14	T	10	1	0.48	-9	75.8%	No	S
MW03-3471	T	9	2	0.51	-3	58.0%	No	S
MW22-ST14	T	7	0	0.00	0	43.7%	Yes	S
MW12-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW15-ST14	T	14	0	0.00	0	47.8%	Yes	S
MW16-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW20-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW17-ST14	T	10	2	3.03	-9	75.8%	No	NT
MW19-ST14	T	10	0	0.00	0	46.4%	Yes	S

Project: Andrews AFB ST-14

User Name: McNally

Location: Andrews AFB

State: Maryland

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
TOLUENE								
MW11-ST14	T	14	5	0.48	11	70.5%	No	NT
MW18-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW21-ST14	T	2	0	0.00	0	0.0%	Yes	N/A
MW31-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW38-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW37-ST14	T	10	0	0.00	0	46.4%	Yes	S
ST14-MW02	T	9	7	1.15	13	89.0%	No	NT
MW24-ST14	T	10	0	0.00	0	46.4%	Yes	S
ST14-MW03	T	10	10	0.66	-33	99.9%	No	D
MW34-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW33-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW32-ST14	T	10	0	0.00	0	46.4%	Yes	S
ST14-MW01	T	9	0	0.00	0	46.0%	Yes	S
ST14-MW05	T	10	10	0.41	-17	92.2%	No	PD
MW35-ST14	T	10	1	0.30	-9	75.8%	No	S
MW30-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW26-ST14	T	6	0	0.00	0	42.3%	Yes	S
ST14-MW09	T	9	0	0.00	0	46.0%	Yes	S
MW29-ST14	T	6	0	0.00	0	42.3%	Yes	S
ST14-MW07	T	10	0	0.00	0	46.4%	Yes	S
MW27-ST14	T	9	0	0.00	0	46.0%	Yes	S
ST14-MW06	T	9	1	1.70	-4	61.9%	No	NT
MW25-ST14	T	6	1	0.71	1	50.0%	No	NT
ST14-MW08	T	9	0	0.00	0	46.0%	Yes	S
XYLENES, TOTAL								
MW10-ST14	S	9	9	0.86	-4	61.9%	No	S
ST14-MW04	S	10	10	0.25	-1	50.0%	No	S
ST14-MW01	T	9	0	0.00	0	46.0%	Yes	S
ST14-MW08	T	9	0	0.00	0	46.0%	Yes	S
MW13-ST14	T	14	0	0.00	0	47.8%	Yes	S
MW03-3471	T	9	4	0.83	0	46.0%	No	S
ST14-MW02	T	9	7	1.14	17	95.1%	No	I
MW11-ST14	T	14	0	0.00	0	47.8%	Yes	S
ST14-MW07	T	10	0	0.00	0	46.4%	Yes	S
ST14-MW03	T	10	6	1.15	-23	97.7%	No	D
ST14-MW05	T	10	10	0.38	3	56.9%	No	NT
ST14-MW06	T	9	1	1.44	-4	61.9%	No	NT
MW12-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW31-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW23-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW24-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW25-ST14	T	6	1	0.36	1	50.0%	No	NT
MW22-ST14	T	7	0	0.00	0	43.7%	Yes	S
MW26-ST14	T	6	0	0.00	0	42.3%	Yes	S
MW21-ST14	T	2	0	0.00	0	0.0%	Yes	N/A
ST14-MW09	T	9	0	0.00	0	46.0%	Yes	S
MW29-ST14	T	6	0	0.00	0	42.3%	Yes	S
MW20-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW16-ST14	T	10	0	0.00	0	46.4%	Yes	S

Project: Andrews AFB ST-14

User Name: McNally

Location: Andrews AFB

State: Maryland

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
XYLENES, TOTAL								
MW19-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW38-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW32-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW18-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW33-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW17-ST14	T	10	3	1.06	-16	90.7%	No	PD
MW34-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW35-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW27-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW37-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW15-ST14	T	14	0	0.00	0	47.8%	Yes	S
MW30-ST14	T	9	0	0.00	0	46.0%	Yes	S

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-
Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Mann-Kendall Statistics Summary

Project: Andrews AFB ST-14

User Name: McNally

Location: Andrews AFB

State: Maryland

Time Period: 2/27/2006 to 4/5/2010

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: 1/2 Detection Limit

J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
CARBON TETRACHLORIDE								
MW24-ST14	S	10	10	0.48	-6	66.8%	No	S
MW23-ST14	S	10	1	3.03	-9	75.8%	No	NT
MW18-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW03-3471	T	9	0	0.00	0	46.0%	Yes	S
MW25-ST14	T	6	0	0.00	0	42.3%	Yes	S
MW22-ST14	T	7	0	0.00	0	43.7%	Yes	S
MW21-ST14	T	2	0	0.00	0	0.0%	Yes	N/A
MW27-ST14	T	9	9	0.33	-12	87.0%	No	S
MW19-ST14	T	10	2	0.69	-17	92.2%	No	PD
MW29-ST14	T	6	0	0.00	0	42.3%	Yes	S
MW17-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW16-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW15-ST14	T	14	0	0.00	0	47.8%	Yes	S
MW13-ST14	T	14	0	0.00	0	47.8%	Yes	S
MW12-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW11-ST14	T	14	1	0.67	-13	74.1%	No	S
MW10-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW20-ST14	T	4	0	0.00	0	37.5%	Yes	S
MW38-ST14	T	4	0	0.00	0	37.5%	Yes	S
ST14-MW08	T	9	1	0.40	-8	76.2%	No	S
ST14-MW07	T	10	5	1.12	-27	99.2%	No	D
ST14-MW06	T	9	1	1.04	0	46.0%	No	NT
ST14-MW05	T	10	10	0.65	3	56.9%	No	NT
ST14-MW04	T	10	0	0.00	0	46.4%	Yes	S
ST14-MW03	T	10	5	0.84	5	63.6%	No	NT
MW26-ST14	T	6	0	0.00	0	42.3%	Yes	S
ST14-MW01	T	9	9	0.33	11	84.6%	No	NT
ST14-MW09	T	10	0	0.00	0	46.4%	Yes	S
MW37-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW35-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW34-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW33-ST14	T	10	0	0.00	0	46.4%	Yes	S
MW32-ST14	T	10	7	0.83	-26	98.9%	No	D
MW31-ST14	T	9	0	0.00	0	46.0%	Yes	S
MW30-ST14	T	9	0	0.00	0	46.0%	Yes	S
ST14-MW02	T	9	0	0.00	0	46.0%	Yes	S

Project: Andrews AFB ST-14

User Name: McNally

Location: Andrews AFB

State: Maryland

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
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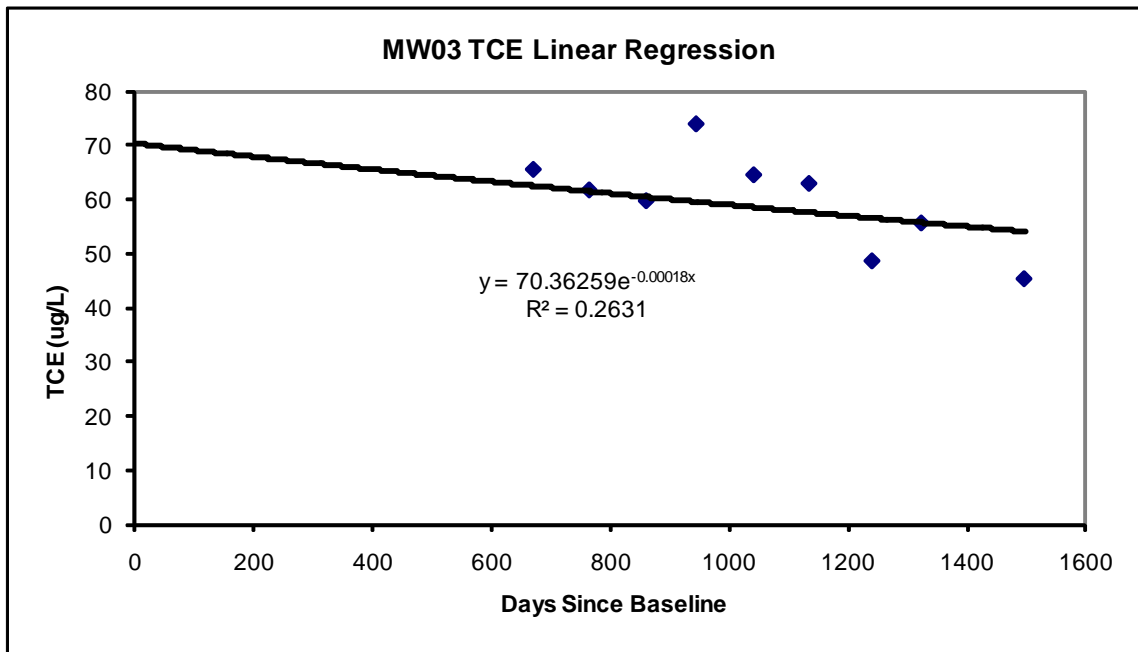
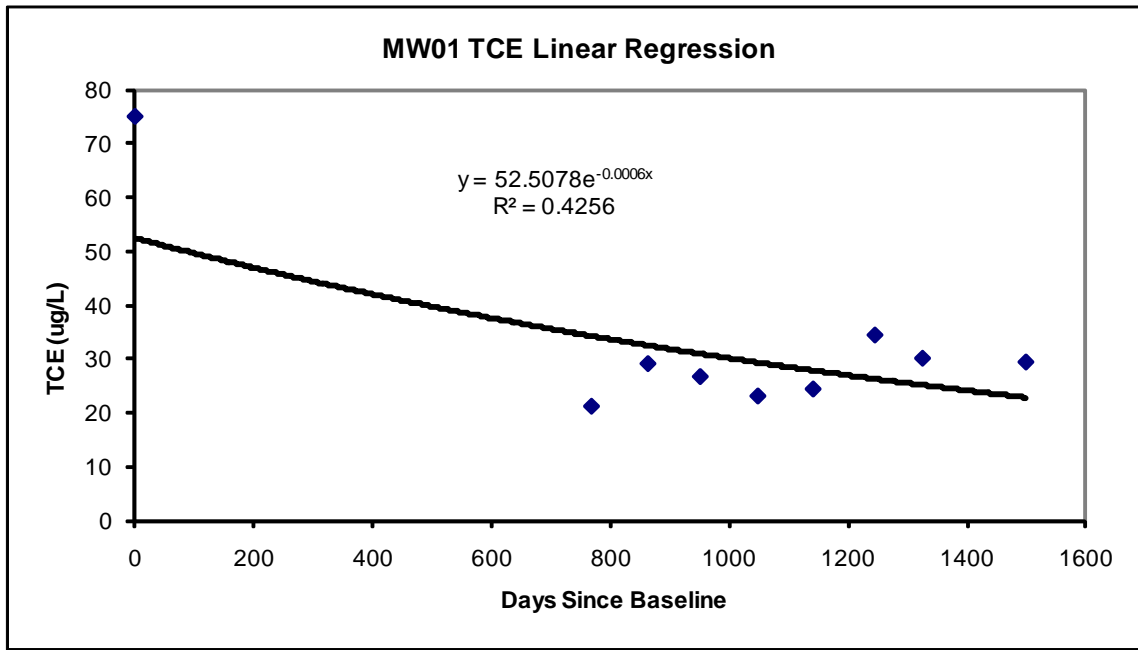
CARBON TETRACHLORIDE

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-
Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

APPENDIX H
LINEAR REGRESSION TREND GRAPHS

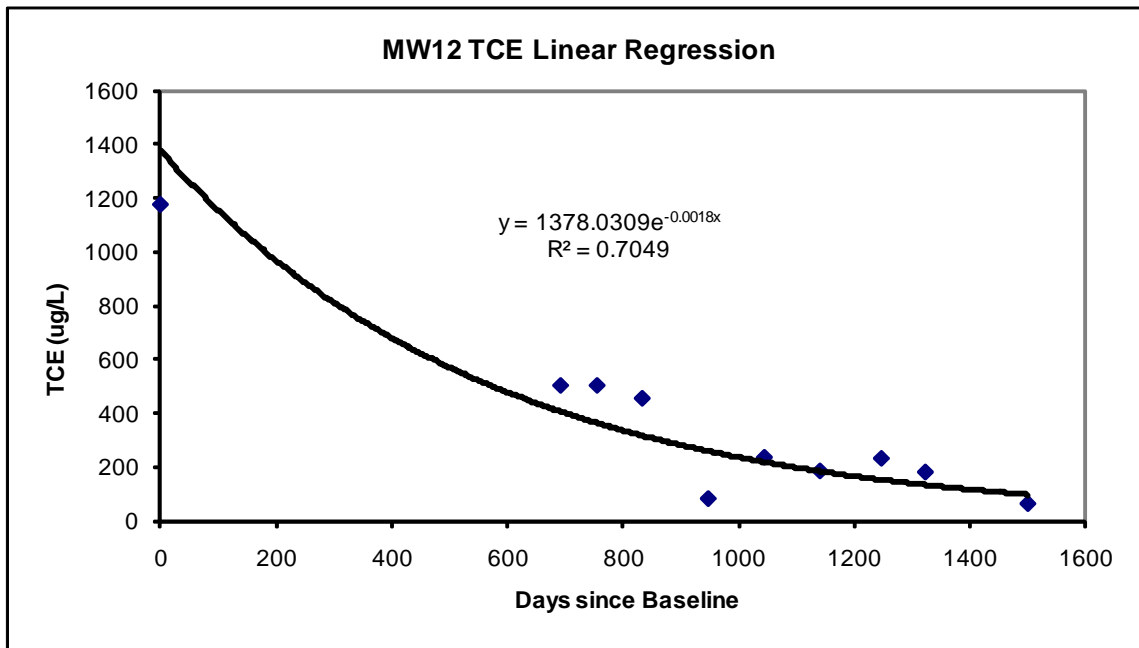
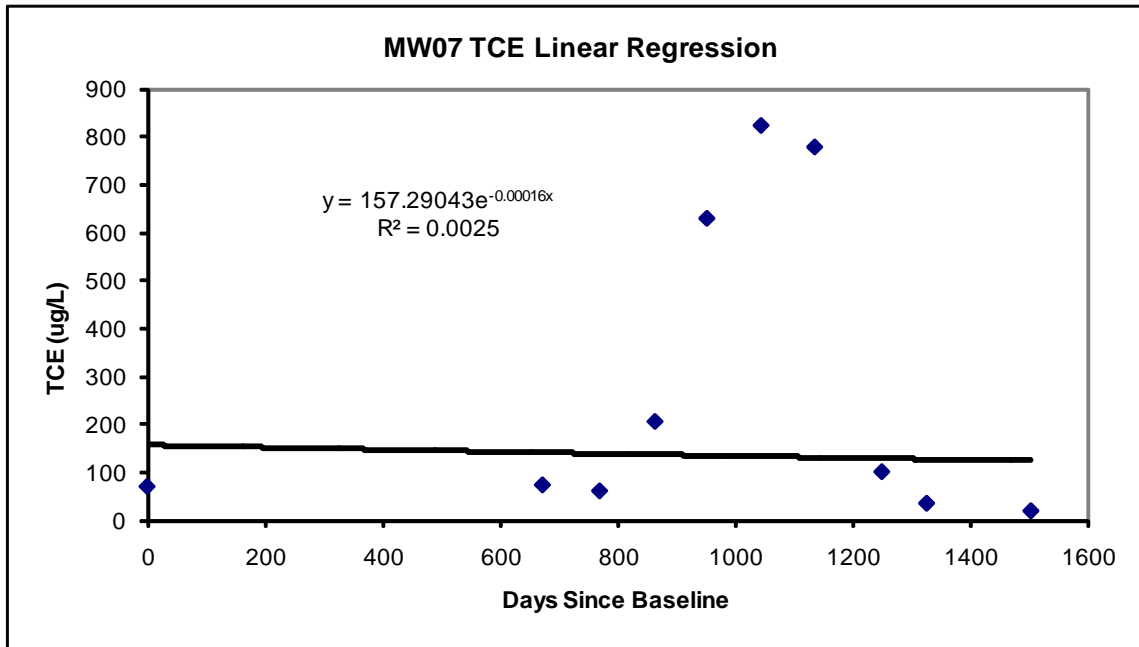
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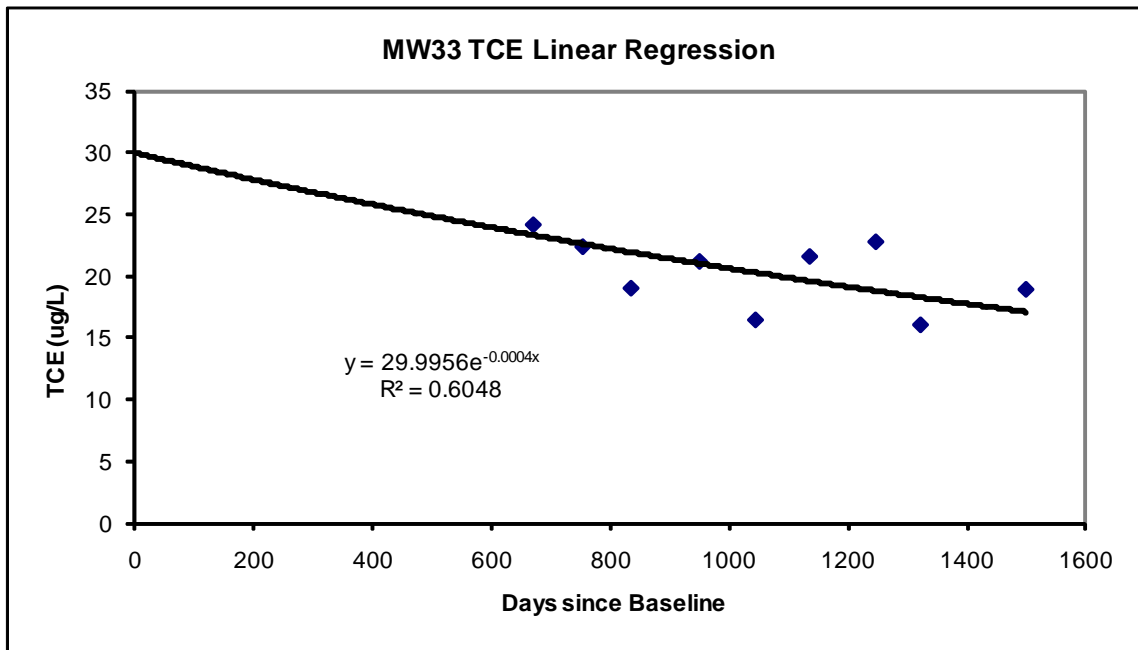
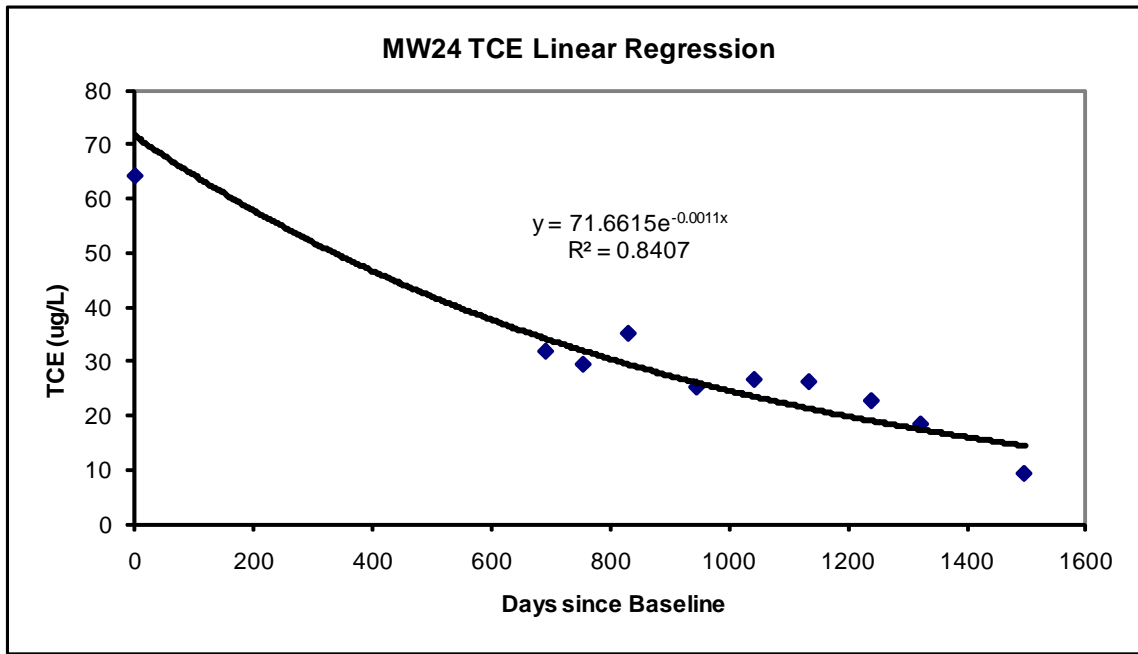
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AD	ST-14 Second Long-Term	PROJECT NO.	60135568
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AD	Appendix H	SHEET NO.	1 of 10
CHK BY:	Linear Regression	DRAWING NO.	
IG	Exponential Curve Fits		
APP BY:			
JG			

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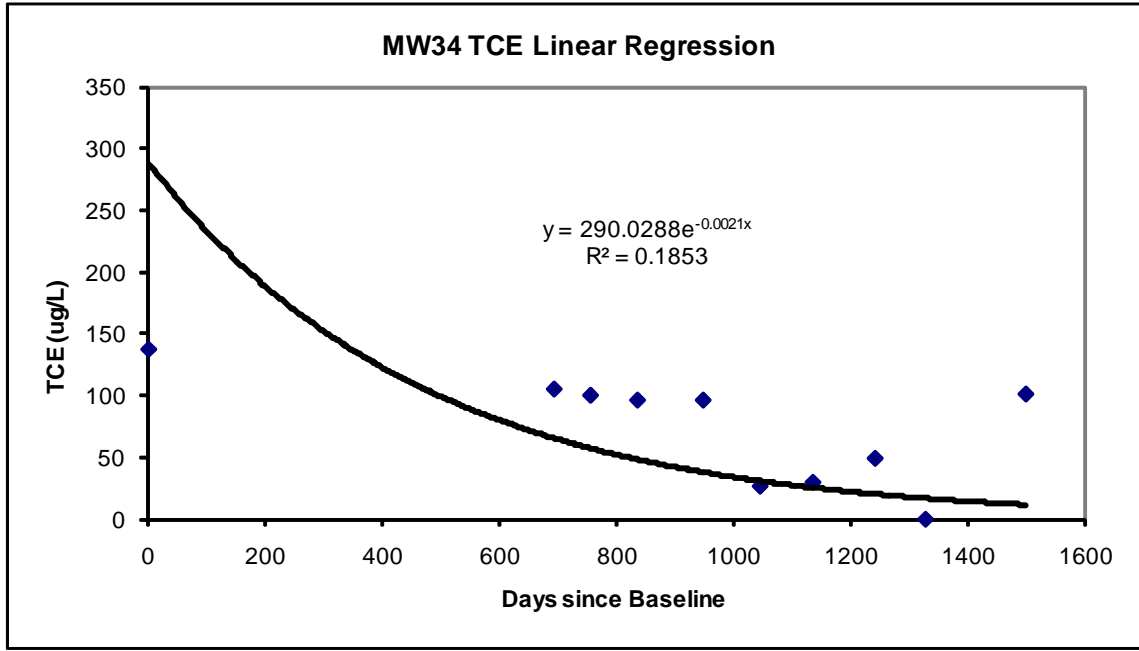
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APP BY: JG		SHEET NO. 2 of 10
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DES BY:	Monitoring Report	FILENAME	Appendix H Lin Reg Graphs.dwg
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IG	Exponential Curve Fits		
APP BY:			
JG			

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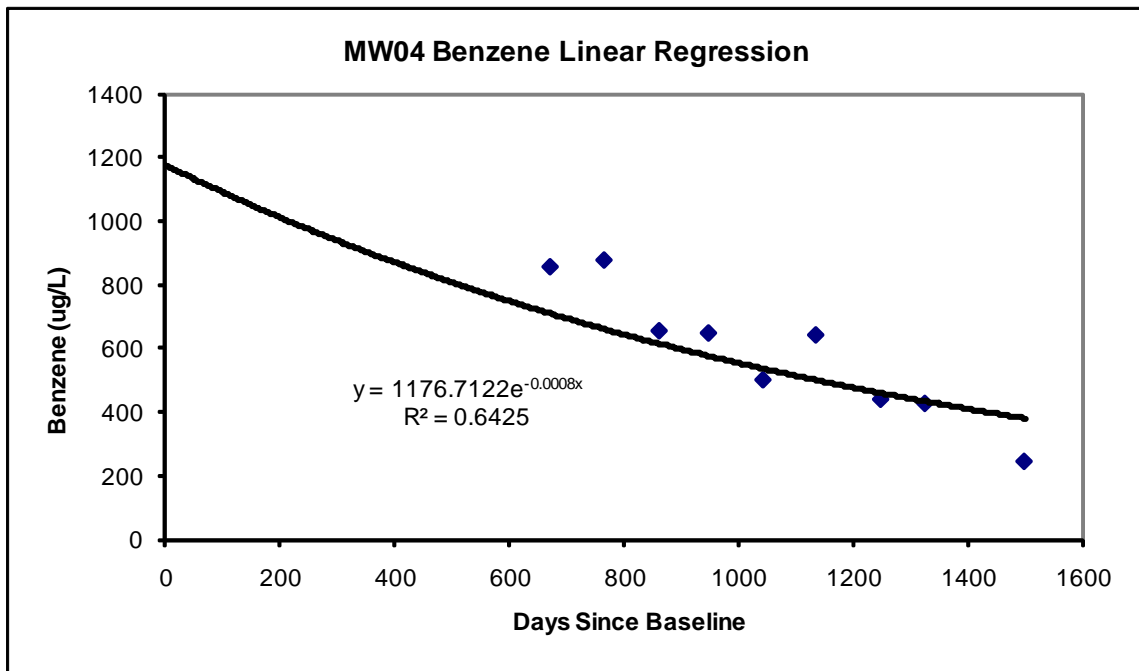
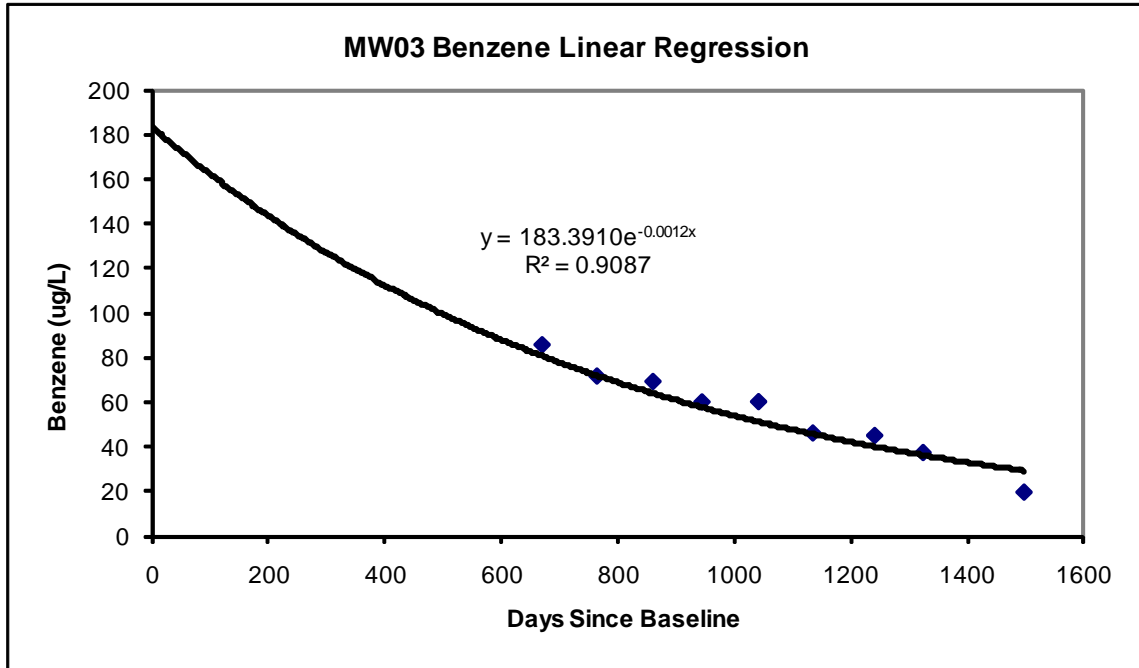



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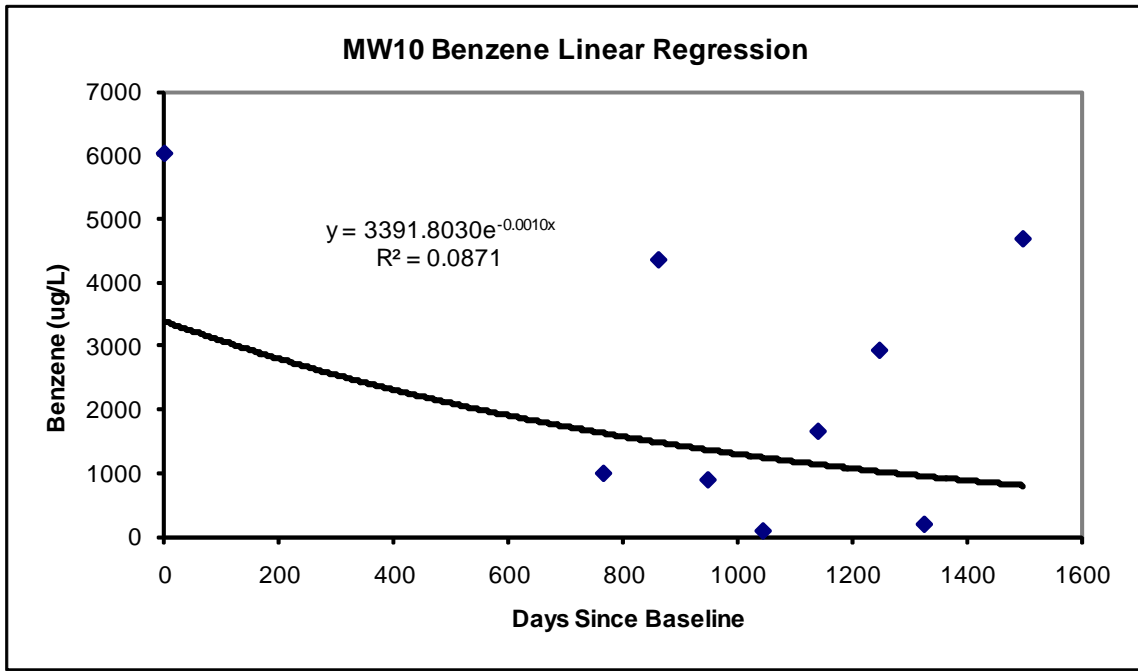
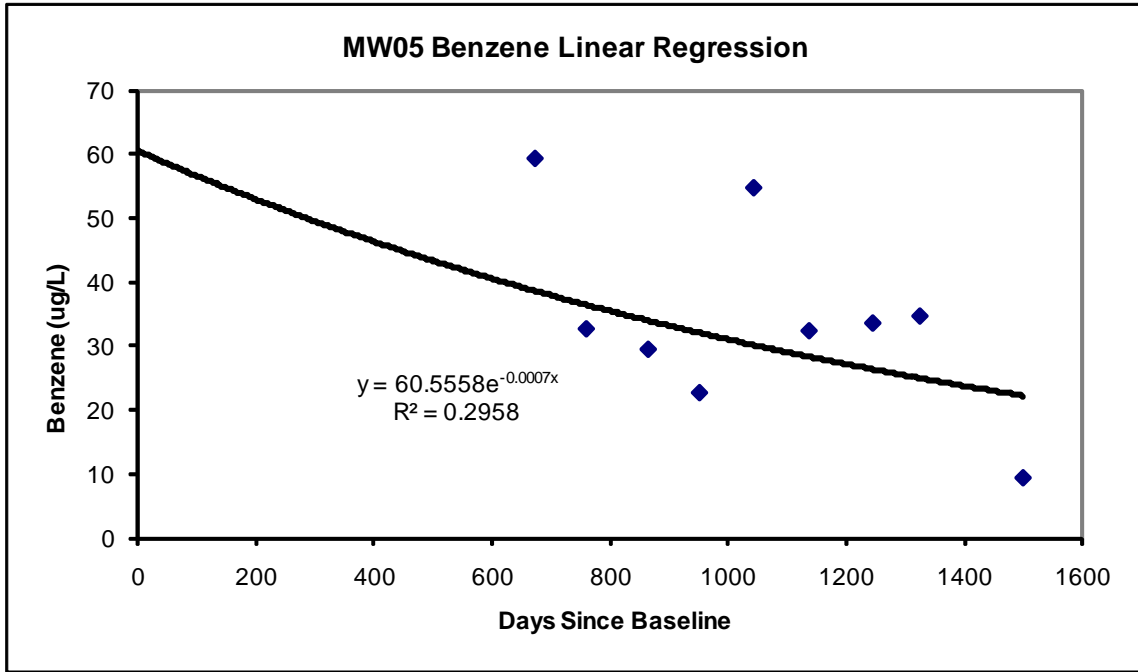
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ST-14 Second Long-Term		June 2005
Monitoring Report		PROJECT NO. 60135568
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Linear Regression		SHEET NO. 4 of 10
Exponential Curve Fits		DRAWING NO.



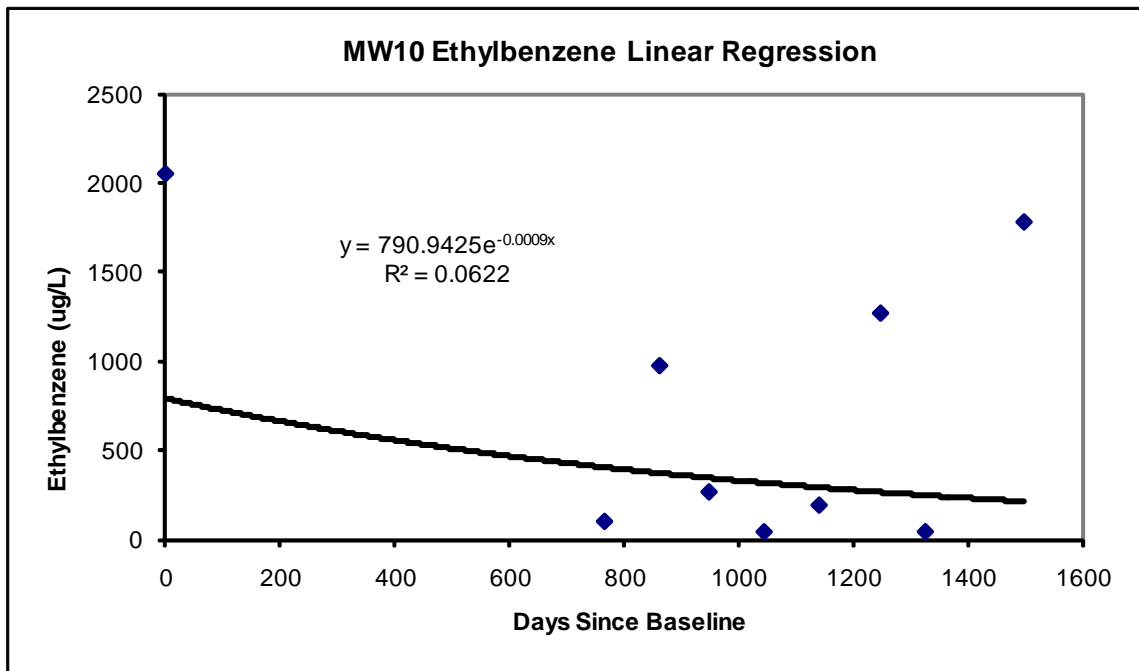
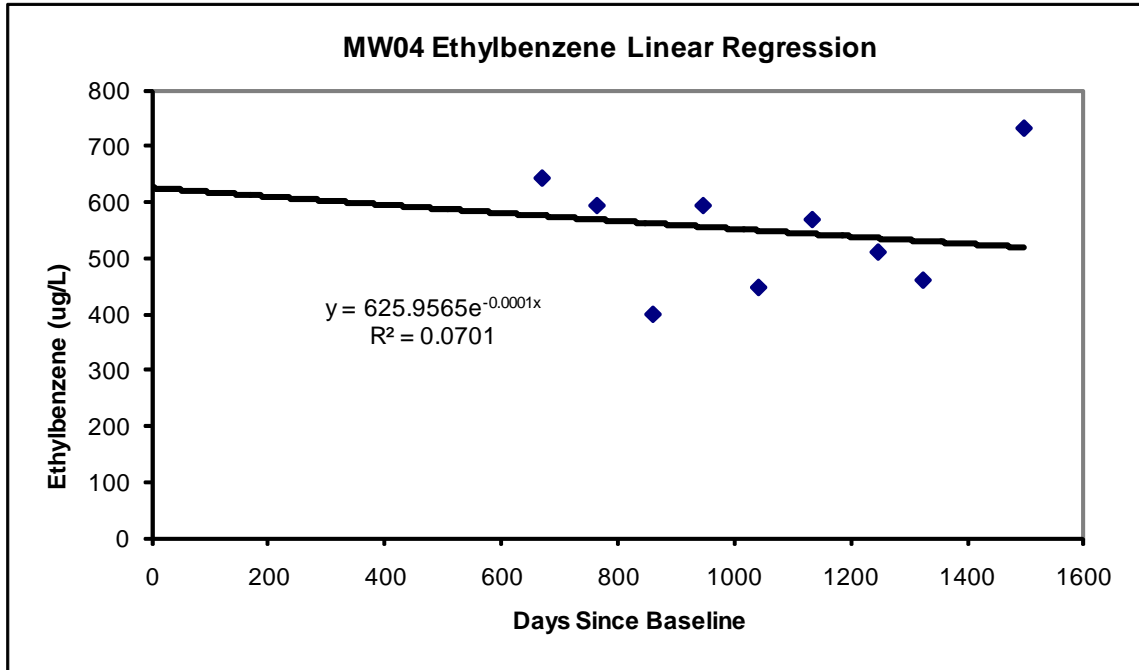
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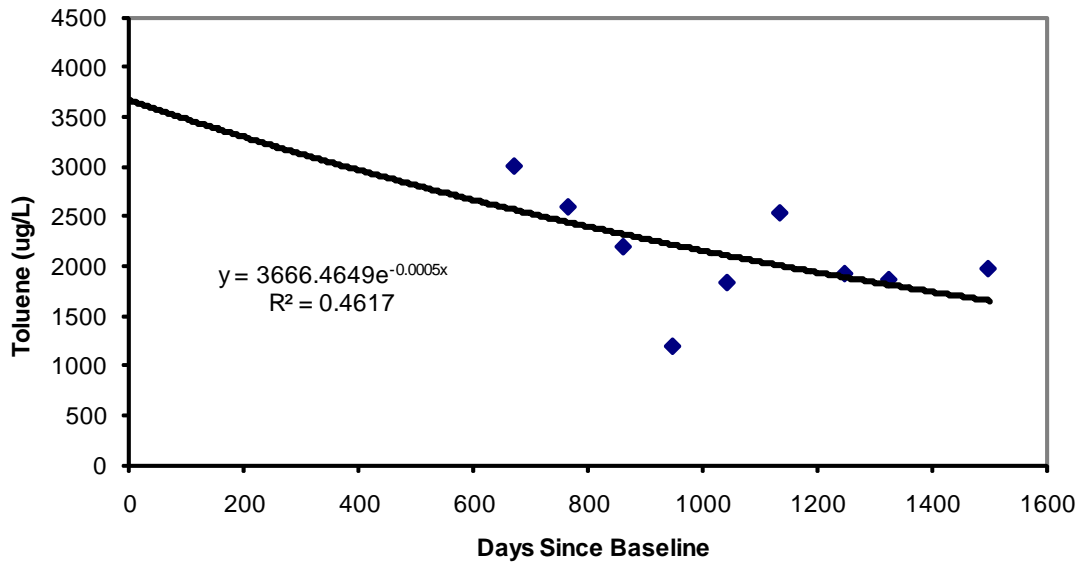
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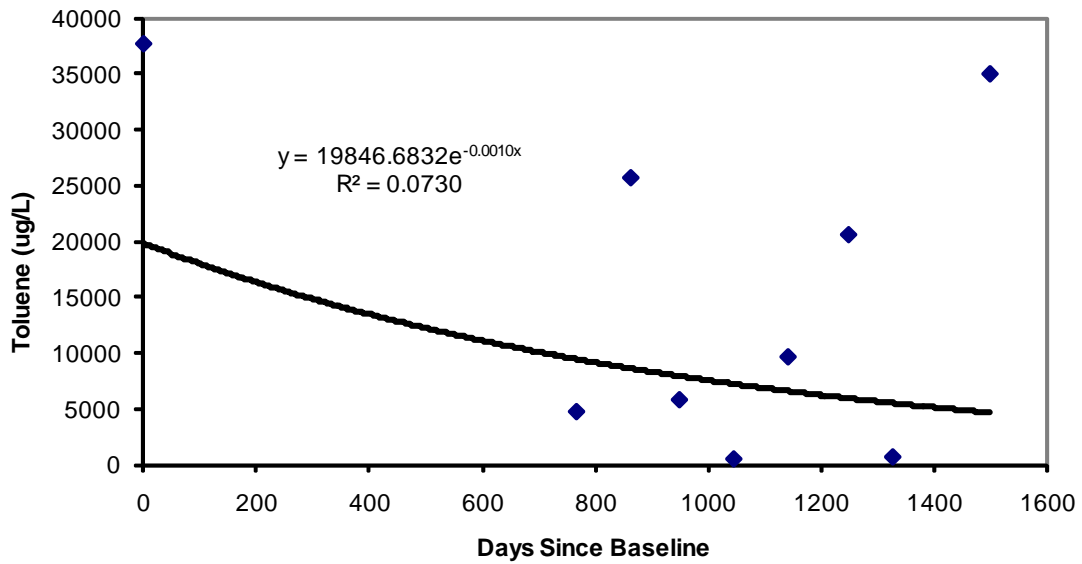
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MW04 Toluene Linear Regression



MW10 Toluene Linear Regression



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**Appendix H
Linear Regression
Exponential Curve Fits**

REV	DESCRIPTION	DRN	CHK	DATE (M/Y)

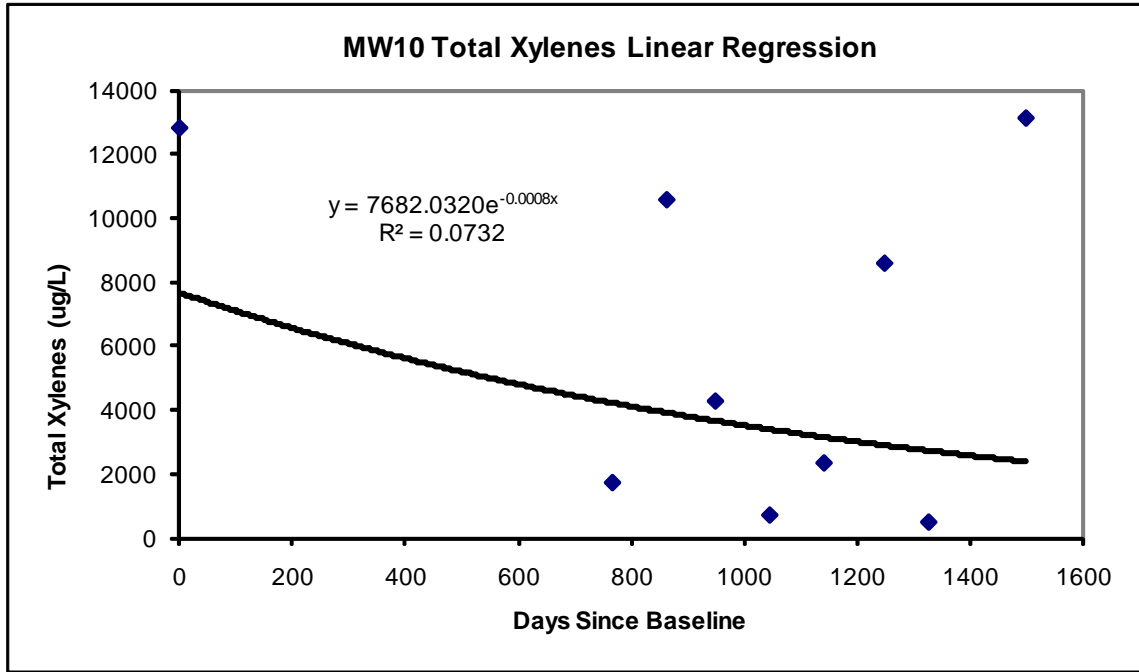
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PROJECT NO. 60135568

FILENAME Appendix H Lin Reg Graphs.dwg

SHEET NO. 8 of 10

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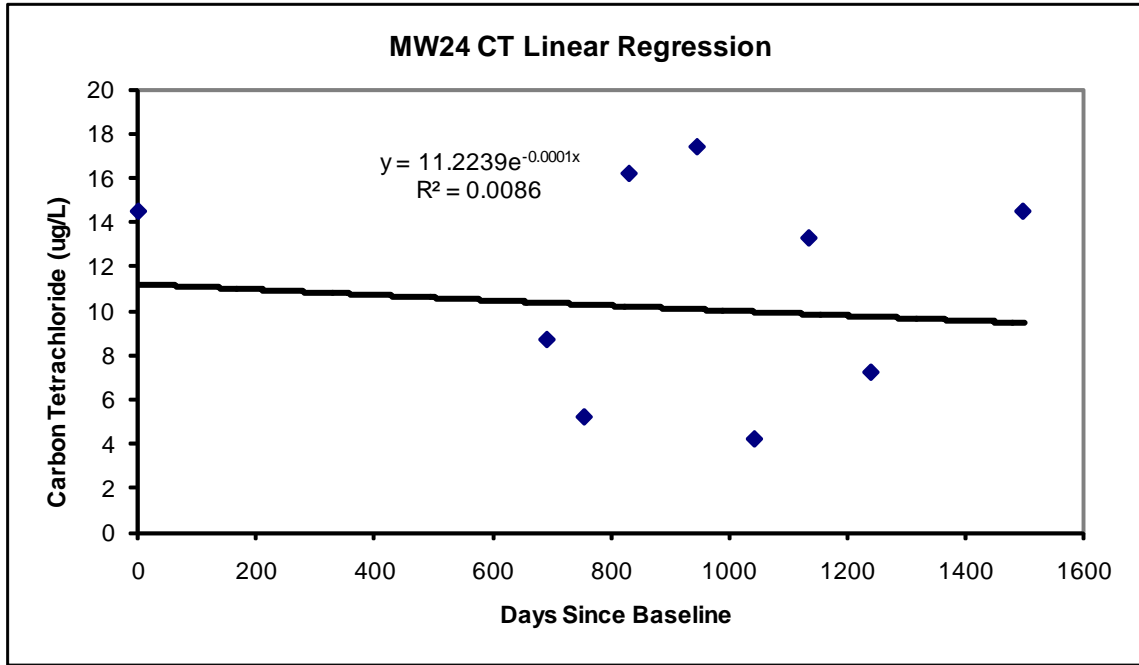


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Andrews AFB - Camp Springs, MD ST-14 Second Long-Term Monitoring Report	PROJECT START DATE (M / Y) June 2005
Appendix H Linear Regression Exponential Curve Fits	PROJECT NO. 60135568
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**Appendix H
 Linear Regression
 Exponential Curve Fits**

REV	DESCRIPTION	DRN	CHK	DATE (M/Y)

PROJECT START DATE (M / Y)
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 60135568

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