N65928.AR.001349
NTC ORLANDO
5090.3a

SITE INVESTIGATION FOR STUDY AREA 36 WITH TRANSMITTAL LETTER NTC ORLANDO FL

2/1/2003

TETRA TECH

TETRA TECH NUS, INC.
800 Oak Ridge Turnpike, A-600 ▪ Oak Ridge, Tennessee 37830
(865) 483-9900 ▪ FAX: (865) 483-2014 ▪ www.tetratech.com

0203-E059

February 14, 2003

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: Ms. Barbara Nwokike, Code ES33
P.O. Box 190010
2155 Eagle Drive
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0024

Subject: Final Site Investigation Report for Study Area 36
Naval Training Center, Orlando, Florida

Dear Ms. Nwokike:

Enclosed is the final Site Investigation Report for Study Area 36 in hardcopy and CD formats. Comments received from the Orlando Partnering Team have been incorporated into the report. A second copy of the transmittal has been mailed to Southern Division's Orlando office.

If you have any questions, please contact me at (865) 220-4730.

Sincerely,

Allan T. Jenkins for SBM

Steven B. McCoy, P.E.
Task Order Manager

SBM:tko

Enclosure

c: Ms. Barbara Nwokike, Southern Division (Orlando Office) (hardcopy and CD)
Mr. David Grabka, FDEP (hardcopy and CD)
Mr. Gregory Fraley, USEPA Region 4 (hardcopy and CD)
Mr. Steve Tsangaris, CH2M Hill (CD)
Mr. Mark Salvetti, Harding ESE (CD)
Mr. Michael Campbell, Tetra Tech NUS (hardcopy)
Mr. Allan Jenkins, Tetra Tech NUS (hardcopy)
Mr. J.E. Bentkowski, Gannett Fleming (hardcopy and CD)
Mr. Mark Perry, Tetra Tech NUS (unbound hardcopy and CD)
Ms. Debbie Wroblewski, Tetra Tech NUS (cover letter only)
File/db

Rev. 1
02/14/03

SITE INVESTIGATION REPORT
for
STUDY AREA 36

Naval Training Center
Orlando, Florida

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888

Contract Task Order 0024

February 2003

Rev. 1
02/14/03

SITE INVESTIGATION REPORT
FOR
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0024

FEBRUARY 2003

PREPARED UNDER THE SUPERVISION OF:

STEVEN B. McCOY
TASK ORDER MANAGER
TETRA TECH NUS, INC.
OAK RIDGE, TENNESSEE

APPROVED FOR SUBMITTAL BY:

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

P.G. CERTIFICATION

I hereby certify that this document, *Site Investigation Report for Study Area 36*, was prepared under my direct supervision in accordance with acceptable standards of geological practice.

Allan T. Jenkins 2/13/03

Allan T. Jenkins, P.G. / Date
License No. PG-0000663

ALLAN T. JENKINS
LICENSE
No. 0000663
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST

TABLE OF CONTENTS

SECTION **PAGE**

PROFESSIONAL GEOLOGIST CERTIFICATION iii
ACRONYMS AND ABBREVIATIONS vii
EXECUTIVE SUMMARY ix

1.0 INTRODUCTION 1-1
1.1 SITE BACKGROUND 1-1
1.2 ENVIRONMENTAL ACTIONS 1-4

2.0 ENVIRONMENTAL SETTING 2-1
2.1 SOILS 2-1
2.2 SITE GEOLOGY 2-1
2.3 SITE HYDROGEOLOGY 2-1

3.0 SITE INVESTIGATION AND REMEDIAL ACTIVITIES 3-1
3.1 SITE SCREENING 3-1
3.1.1 Soil Gas Survey 3-1
3.1.2 Soil Sampling 3-1
3.1.3 Groundwater Sampling 3-1
3.1.4 Natural Attenuation Sampling and Evaluation 3-3
3.2 SITE INVESTIGATION 3-3
3.2.1 Soil Sampling 3-6
3.2.2 Groundwater Sampling 3-8
3.3 INTERIM REMEDIAL ACTION 3-17
3.4 DATA VALIDATION 3-18

4.0 SITE INVESTIGATION RESULTS 4-1
4.1 GROUNDWATER FLOW 4-1
4.1.1 Groundwater Data (2000-2001) 4-1
4.1.2 Groundwater Data (2002) 4-8
4.2 SOIL SAMPLING RESULTS 4-12
4.3 GROUNDWATER SAMPLING RESULTS 4-14
4.3.1 Site Investigation Data 4-14
4.3.2 IRA Monitoring Data 4-29

5.0 GROUNDWATER INTERIM REMEDIAL ACTION 5-1
5.1 PROCESS DESCRIPTION 5-1
5.2 FIELD ACTIVITIES 5-1
5.2.1 IRA Installation 5-1
5.2.2 Vegetable Oil Injections 5-2
5.3 IRA RESULTS 5-2
5.3.1 Organic Parameters 5-2
5.3.2 Natural Attenuation Parameters 5-3
5.4 OPERATING PROPERLY AND SUCCESSFULLY 5-4

6.0 CONCLUSIONS AND RECOMMENDATIONS 6-1
6.1 SOIL CONTAMINATION 6-1
6.2 GROUNDWATER CONTAMINATION 6-1
6.3 PROPERTY CLASSIFICATION CODE 6-1
6.4 OPT CONCURRENCE 6-3

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

REFERENCES **R-1**

APPENDICES

A BORING LOGS AND WELL COMPLETION FORMS **A-1**
B FIELD SAMPLING FORMS **B-1**
C SITE INVESTIGATION ANALYTICAL DATA **C-1**
D IRA DATA **D-1**
E GROUNDWATER FLOW CALCULATIONS (TtNUS, 2002) **E-1**

TABLES

NUMBER **PAGE**

1-1 Chronological Summary of Environmental Activities 1-5
2-1 Groundwater Elevations 2-7
3-1 Monitoring Well Data 3-13
4-1 Aquifer Horizontal Gradients 4-5
4-2 Aquifer Vertical Gradients 4-7
4-3 Analytes Detected in Surface Soils in Confirmation Sampling at Study Area 36 4-13
4-4 Summary of Detections in Groundwater 4-15

FIGURES

NUMBER **PAGE**

1-1 Site Location Map 1-2
1-2 Site Plan 1-3
2-1 Cross Section A-A' 2-3
2-2 Well Depth Schematic – North Storage Yard 2-6
3-1 Surface Soil, Soil Boring, and Monitoring Well Locations 3-2
3-2 Groundwater Organic Exceedances, Second Round of Monitoring Well Sampling 3-4
3-3 Groundwater Organic Exceedances, Third Round of Monitoring Well Sampling 3-5
3-4 Soil Sampling Locations, April 2000 3-7
3-5 Monitoring Well Locations 3-11
4-1 Groundwater Elevation Contours, Zones A, B, and C, July and October 2001 4-3
4-2 Hydrograph for Zone A Wells 4-9
4-3 Hydrograph for Zone B Wells 4-10
4-4 Hydrograph for Zone C Wells 4-11
4-5 VOC Exceedances and Plume Area in Zone A, April 2000 to October 2001 4-23
4-6 VOC Exceedances and Plume Area in Zone B, April 2000 to October 2001 4-25
4-7 VOC Exceedances and Plume Area in Zone C, April 2000 to October 2001 4-27
6-1 Site Map, Study Area 36 - South Main Base 6-2

ACRONYMS AND ABBREVIATIONS

ABB-ES	ABB Environmental Services, Inc.
AST	aboveground storage tank
bgs	below ground surface
BGSV	background screening value
CCI	CH2M Hill Constructors, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CLP	Contract Laboratory Program
COC	contaminant of concern
DCE	dichloroethene
DO	dissolved oxygen
DPT	direct push technology
DQO	Data Quality Objective
FDEP	Florida Department of Environmental Protection
GCTL	Groundwater Cleanup Target Level
HLA	Harding Lawson Associates
IRA	interim remedial action
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
msl	mean sea level
NEPA	National Environmental Policy Act
NTC	Naval Training Center
NTU	Nephelometric Turbidity Unit
OPS	Operating Properly and Successfully
OPT	Orlando Partnering Team
ORP	oxidation-reduction potential
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
POP	Project Operations Plan
PVC	polyvinyl chloride
RBC	Risk-Based Concentration
SA	Study Area

ACRONYMS AND ABBREVIATIONS (Continued)

SCTL	Soil Cleanup Target Level
TAL	Target Analyte List
TCA	1,1,2,2-tetrachloroethane
TCL	Target Compound List
TCE	trichloroethene
TOC	total organic carbon
TRPH	total recoverable petroleum hydrocarbons
TtNUS	Tetra Tech NUS, Inc.
µg/L	micrograms per liter
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

EXECUTIVE SUMMARY

An environmental site investigation was performed by Tetra Tech NUS, Inc. (TtNUS), at Study Area (SA) 36, located at the Main Base of the former Naval Training Center (NTC), Orlando. Prior site screening studies revealed isolated occurrences of inorganic soil and groundwater contamination. In addition, groundwater was found to be contaminated with the chlorinated solvents tetrachloroethene (PCE) and trichloroethene (TCE). The objective of the site investigation was to determine the nature and extent of soil and groundwater contaminants that may have been released during past activities at the study area. This report describes the field activities, presents and interprets the results of the field activities, including current interim remedial activities, and provides conclusions and recommendations based on those results. In this report the concentrations of contaminants detected in soil and groundwater were compared to residential screening criteria developed by the Florida Department of Environmental Protection and background concentrations established for the NTC, Orlando Main Base.

Study Area Background

SA 36 occupies 1.94 acres in the southwest portion of the Main Base at the former NTC, Orlando. The Navy acquired the Main Base in 1968 and used SA 36 for storage of lumber, pipe, paint, and other materials until the mid-1990s. All of the site features and NTC roads and streets on which the site was located have been demolished and removed by the site developer for the City of Orlando. SA 36 is currently being redeveloped for residential use.

While operated by the Navy, SA 36 included a Paint Shop (Building 2122), a lumber storage facility (Building 2121), and the western half of the Public Works Yard. Paint and paint thinner were stored in Building 2122. Runoff from the paved storage areas at SA 36 flowed to a drainage swale on the western edge of the site. Paint residue and stained soil were observed in the swale north and south of a drain adjacent to the Paint Shop in Building 2122.

The North Storage Area was a paved area north and east of the Paint Shop. The western half of the Public Works Yard lay east of the lumber storage facility (Building 2121) and was paved with asphalt. It was used to store a variety of hazardous and non-hazardous materials including waste oil drums, transformers, and batteries prior to disposal. The South Storage Area had a lime rock surface and was divided into two areas by chain-link fence. The larger fenced area was used to store bulky items such as pipes, fire hydrants, and bricks. A smaller fenced area south and east of Building 2121 was used to store oil and hazardous materials.

Site Screening

The environmental site screening at SA 36 was performed during 1997 and 1998 by Harding Lawson Associates, Inc. A soil gas survey was performed, and subsequent surface and subsurface soil sampling yielded concentrations of antimony, arsenic, barium, benzo[*a*]pyrene, mercury, and total recoverable petroleum hydrocarbons (TRPH) that exceeded residential screening criteria.

Two phases of groundwater screening utilizing direct push technology sampling and the installation and sampling of 14 monitoring wells were performed during the site screening investigation. Direct push technology samples were collected at various depths and monitoring wells were installed above and below the cemented sand interval that lies between approximately 15 to 25 feet below ground surface (bgs). The presence of arsenic and aluminum in groundwater above their respective screening criteria was attributed to the presence of high turbidity in the groundwater samples, and further sampling for these constituents was not required by the Orlando Partnering Team (OPT). However, the groundwater data also showed that chlorinated solvents were present in the aquifer at depths ranging from approximately 15 to 35 feet bgs in the North Storage Area (north and east of Building 2122). No exceedances of the groundwater screening criteria were observed in the deepest monitoring wells completed near the bottom of the surficial aquifer at depths of 60 to 70 feet bgs.

Site Investigation

TtNUS performed the site investigation to confirm and define the horizontal extent of the soil contamination and to define the lateral and vertical extent of chlorinated solvents and antimony in groundwater. In April 2000, 28 soil samples were collected from areas surrounding the sampling locations where previously observed concentrations of antimony, arsenic, barium, mercury, and TRPH exceeded screening criteria. Some elevated concentrations were noted, but none exceeded screening criteria. No additional soil sampling was performed.

One monitoring well was also installed and sampled in the South Storage Area in April 2000. The analytical results, combined with results from the site screening, showed that groundwater in the South Storage Area met residential screening criteria and no further groundwater sampling was conducted in that area.

Ten wells were installed in and near the North Storage Area in August 2000. Groundwater samples collected from those wells provided data to further define the horizontal and vertical extent of the chlorinated solvent plume. However, an additional seven wells installed during the interim remedial

action (IRA) and well replacement activities described below were required to complete definition of the plume.

Interim Remedial Action

CH2M Hill Constructors, Inc., initiated the groundwater IRA in November 2000 to address the chlorinated solvent contamination in groundwater at SA 36. Under anaerobic conditions, biodegradation of chlorinated solvents usually proceeds through reductive chlorination, and an adequate source of carbon must be available for the process to occur. Food-grade vegetable oil, an inexpensive, innocuous carbon source that is not regulated as a contaminant by the U.S. Environmental Protection Agency (USEPA), was selected for injection into the aquifer to provide additional carbon.

Twelve new monitoring wells were installed in November 2000 and sampled in December 2000 to establish an analytical baseline for the IRA. Nine hundred gallons of vegetable oil were injected into 15 injection points in January 2001. Groundwater sampling was conducted in March, August, and October 2001 to monitor the remedial progress. Each groundwater sampling round included analyses for volatile organic compounds and several parameters that indicate the progress of biological processes. Following the October 2001 sampling round, the analytical data showed substantial progress in decreasing the contaminant concentrations and an additional 540 gallons of vegetable oil were injected in November 2001. In a draft report issued in April 2002, the IRA was evaluated to determine if the process is "operating properly and successfully" (OPS) as defined by the USEPA. A remedial action is operating properly if it is operating as designed, and successfully when its operation indicates that it can achieve cleanup levels or other performance goals in a reasonable period of time and the operation is protective of human health and the environment. It was concluded in the report that progress is being made toward the cleanup objectives, and the IRA is "operating properly and successfully."

All monitoring wells at SA 36 were abandoned in January 2002 prior to demolition activities associated with property transfer and re-development actions at NTC, Orlando. Nodarse and Associates, Inc., a subcontractor for the site developer, installed 17 replacement monitoring wells in April and May 2002 to continue monitoring of the IRA and the groundwater plume.

Conclusions and Recommendations

The site screening identified exceedances of Florida Soil Cleanup Target Levels, but subsequent sampling in the site investigation indicated that no exceedances were present. As a result, the OPT decided that no further investigation of soil was required. It is recommended that the soil at SA 37 be considered suitable for transfer under a residential reuse scenario.

The extent of the groundwater contamination was determined in the site investigation, and a groundwater use restriction area was established. The groundwater contamination (primarily TCE) is limited to the northern portion of the site near the former North Storage Area. The IRA was evaluated as "operating properly and successfully" and the following recommendations are made:

- Continue the IRA of enhancing biodegradation of the PCE/TCE plume with vegetable oil injections performed as required.
- Continue monitoring until contaminant concentrations decrease below the Florida Groundwater Cleanup Target Levels.

The area south of the groundwater restriction boundary meets the requirements for property transfer without groundwater use restrictions. In accordance with U.S. Department of Defense policy, it is recommended that the portion of SA 36 without groundwater contamination be reclassified as 3/LIGHT GREEN (areas where storage, release, and/or migration of hazardous substances has occurred but at concentrations that do not require a removal or remedial action).

The portion of SA 36 associated with contaminated groundwater should remain as 5/YELLOW (areas where release, disposal and/or migration of hazardous substances has occurred, and removal and/or remedial actions are underway, but all required remedial actions have not yet been taken) until the USEPA approves the OPS determination. In accordance with the 1992 Community Environmental Response Facilitation Act (CERFA) amendments to Section 120(h)(3) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), all necessary remedial actions have been taken "if construction and installation of an approved remedial design has been completed and the remedy has been demonstrated to the (USEPA) Administrator to be operating properly and successfully." Upon receipt of the USEPA OPS determination, the groundwater contamination area should be reclassified as 4/DARK GREEN (areas where release, disposal, and/or migration of hazardous substances has occurred, and all remedial actions necessary to protect human health and the environment have been taken).

1.0 INTRODUCTION

An environmental site investigation was conducted at Study Area (SA) 36, located at the Main Base of the former Naval Training Center (NTC), Orlando, Florida. The purpose of the investigation was to determine the nature and extent of chemical contaminants released during past activities at the study area. The technical approach to the investigation was developed in conjunction with the Orlando Partnering Team (OPT), which includes representatives from the Florida Department of Environmental Protection (FDEP), the U.S. Environmental Protection Agency (USEPA) Region 4, and Southern Division, Naval Facilities Engineering Command and their contractors. This report presents the results of the site investigation and interim remedial activities at SA 36 and conclusions and recommendations based on those results.

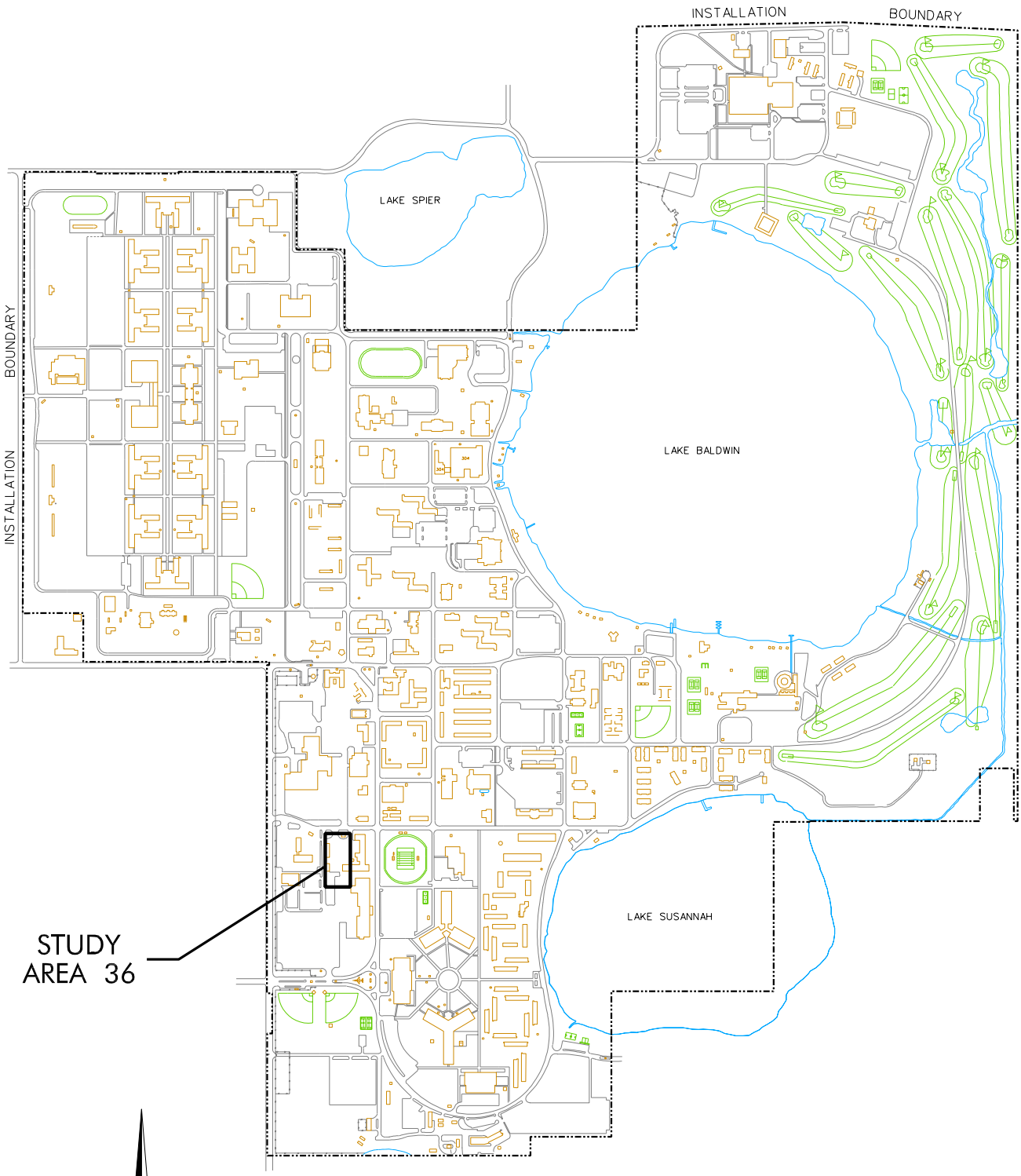
1.1 SITE BACKGROUND

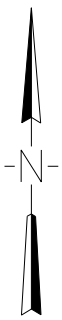
SA 36 occupies 1.94 acres in the southwestern portion of the Main Base of the former NTC (Figure 1-1). Prior to redevelopment activities, the site was located south of Langley Street and west of Grace Hopper Avenue (Figure 1-2). An unnamed road formed the western site boundary. All of the site features and NTC roads and streets on which the site was located have been demolished and removed by the site developer for the City of Orlando.

SA 36 included a Paint Shop (Building 2122), a lumber storage facility (Building 2121), and the western half of the Public Works Yard. Paint and paint thinner were stored in Building 2122. Runoff from the paved storage areas at SA 36 flowed to a drainage swale on the western edge of the site. Paint residue and stained soil were observed in the swale north and south of a drain adjacent to the Paint Shop in Building 2122.

The North Storage Area was a paved area north and east of the Paint Shop (see Figure 1-2). ABB Environmental Services, Inc. (ABB-ES), observed a flammable materials storage cabinet, a 55-gallon drum containing used motor oil, and stockpiles of sand and gravel during an Environmental Baseline Survey (ABB-ES, 1994). The western half of the Public Works Yard lay east of the lumber storage facility (Building 2121) and was paved with asphalt. It was used to store a variety of hazardous and non-hazardous materials including waste oil drums, transformers, and batteries prior to disposal.

The South Storage Area had a lime rock surface and was divided by a chain-link fence (see Figure 1-2). The fenced area was used to store bulky items such as pipes, fire hydrants, and bricks, and included a smaller fenced area south and east of Building 2121 where oil and hazardous materials were stored.





1200 0 1200

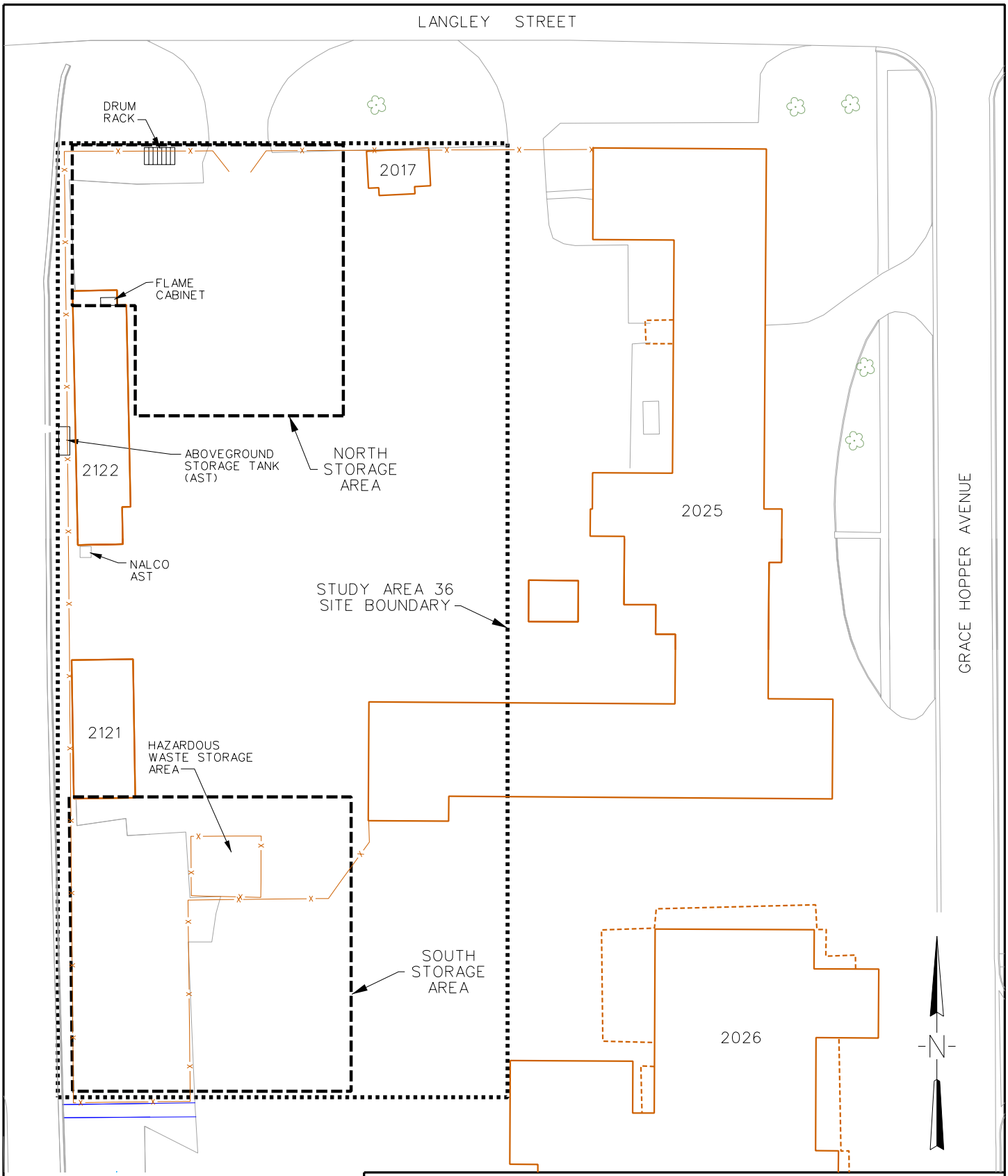
SCALE IN FEET

FIGURE 1-1
SITE LOCATION MAP
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-033.dgn 7-9-02 Site Investigation Report

n8_5x11v.dgn



60 0 60

SCALE IN FEET

SOURCE:
ROADS, BUILIDINGS, ETC. ARE FROM A PHOTOGRAMMETRIC SURVEY BY DEMAPS, INC. AND REPS, INC. IN 1997.

FIGURE 1-2
SITE PLAN
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-032.dgn 8-28-02 Site Inv. Report n8_5x11v.dgn

An area of oil-stained soil approximately 4 feet in diameter was observed along the south fence line during the Environmental Baseline Survey; however, there was no evidence of the spill during a revisit to the site in May 1995 (ABB-ES, 1995a).

The Environmental Baseline Survey reported the presence of two aboveground storage tanks (ASTs) at Building 2122 (ABB-ES, 1994). A 400-gallon AST with no secondary containment stored diesel fuel, and a 265-gallon AST with secondary containment stored NALCO Transport 2802, a boiler feed water treatment material (ABB-ES, 1995a).

1.2 ENVIRONMENTAL ACTIONS

The environmental activities at SA 36 are summarized in Table 1-1. ABB-ES conducted an Environmental Baseline Survey in 1993–1994. The initial phase of screening fieldwork was conducted by Harding Lawson Associates (HLA), formerly ABB-ES, in August through November 1997. Because of exceedances of screening criteria for both soil and groundwater, supplemental site screening was performed to determine the nature and extent of the contamination in March through December 1998.

Subsequently, Tetra Tech NUS, Inc. (TtNUS), performed the site investigation documented in this report to confirm and define the horizontal extent of the soil contamination and to define the horizontal and vertical extent of chlorinated solvents and antimony in groundwater. TtNUS performed fieldwork from April through December 2000, but additional monitoring wells were required to fully delineate the extent of the chlorinated solvent contamination in the northern portion of the site. CH2M Hill Constructors, Inc. (CCI), installed and sampled five plume delineation monitoring wells in November-December 2000, while performing other fieldwork required for an Interim Remedial Action (IRA). Nodarse & Associates, Inc. (Nodarse), installed the final two wells required to complete the groundwater plume delineation in April 2002 during a well replacement program necessitated by the redevelopment activities for the Main Base property.

The IRA performed by CCI consists of injecting vegetable oil to enhance natural biodegradation of the chlorinated solvent plume. As of the date of this report, two injections have been completed (January and November 2001) and periodic sampling to monitor the progress of the groundwater cleanup is continuing.

TABLE 1-1

**CHRONOLOGICAL SUMMARY OF ENVIRONMENTAL ACTIVITIES
STUDY AREA 36**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

Active Use Of The Site	
1940 to 1947	U.S. Army
1947 to 1968	U.S. Air Force
1968 to 1999	U.S. Navy
Environmental Baseline Survey (ABB-ES)	
December 1994	Submittal of Baseline Survey Report
Initial Site Screening (HLA)	
August 1997	Passive soil gas survey
October - November 1997	Surface and subsurface soil sampling. Installation and sampling of wells MW-1A through MW-6A.
Supplemental Site Screening (HLA)	
March - April 1998	Direct push technology groundwater sampling.
June - July 1998	Installation of wells MW-7A through MW 11C. Sampling of wells 1A, 2A, and 6A through 11C.
October 1998	Installation and sampling of wells MW-12C through MW 14D. Wells MW-3A, MW-4A, and MW-5A in South Storage Area were abandoned.
December 1998	Groundwater sampling for natural attenuation parameters
July 1999	Submittal of Site Screening Report
Site Investigation (TtNUS)	
April 2000	Twenty-eight confirmatory surface soil samples. Installation and sampling of well MW-15A in South Storage Area. Sampling of 11 existing wells in the North Storage Area.
August 2000	Installation and sampling of wells MW-16A through MW-25C
November-December 2000	Installation and sampling of wells MW-33A through MW-37C by CCI
Interim Remedial Action (CCI)	
November 2000	Installation of wells MW-26A through MW-32C and 15 injection points
December 2000	Baseline IRA groundwater sampling
January 2001	Initial vegetable oil injection (900 gallons)
March, August, and October 2001 April/May 2002	Quarterly IRA groundwater sampling
November 2001	Second vegetable oil injection (540 gallons)
Developer Actions (Nodarse)	
December 2001	Developer abandoned all existing monitoring wells
April 2002	Seventeen replacement monitoring wells installed.

2.0 ENVIRONMENTAL SETTING

2.1 SOILS

The *Soil Survey of Orange County, Florida* (USDA, 1989) shows that SA 36 is located within the Zolfo-Urban Land soil unit. These soils are described as somewhat poorly drained soils that formed in a sandy marine environment. Zolfo soils are typically found on broad, low ridges on the flatwoods with slopes less than 2 percent. The thickness of the soil is 80 inches or more and consists of fine sand, of which 90 percent or more passes the U.S. No. 40 sieve.

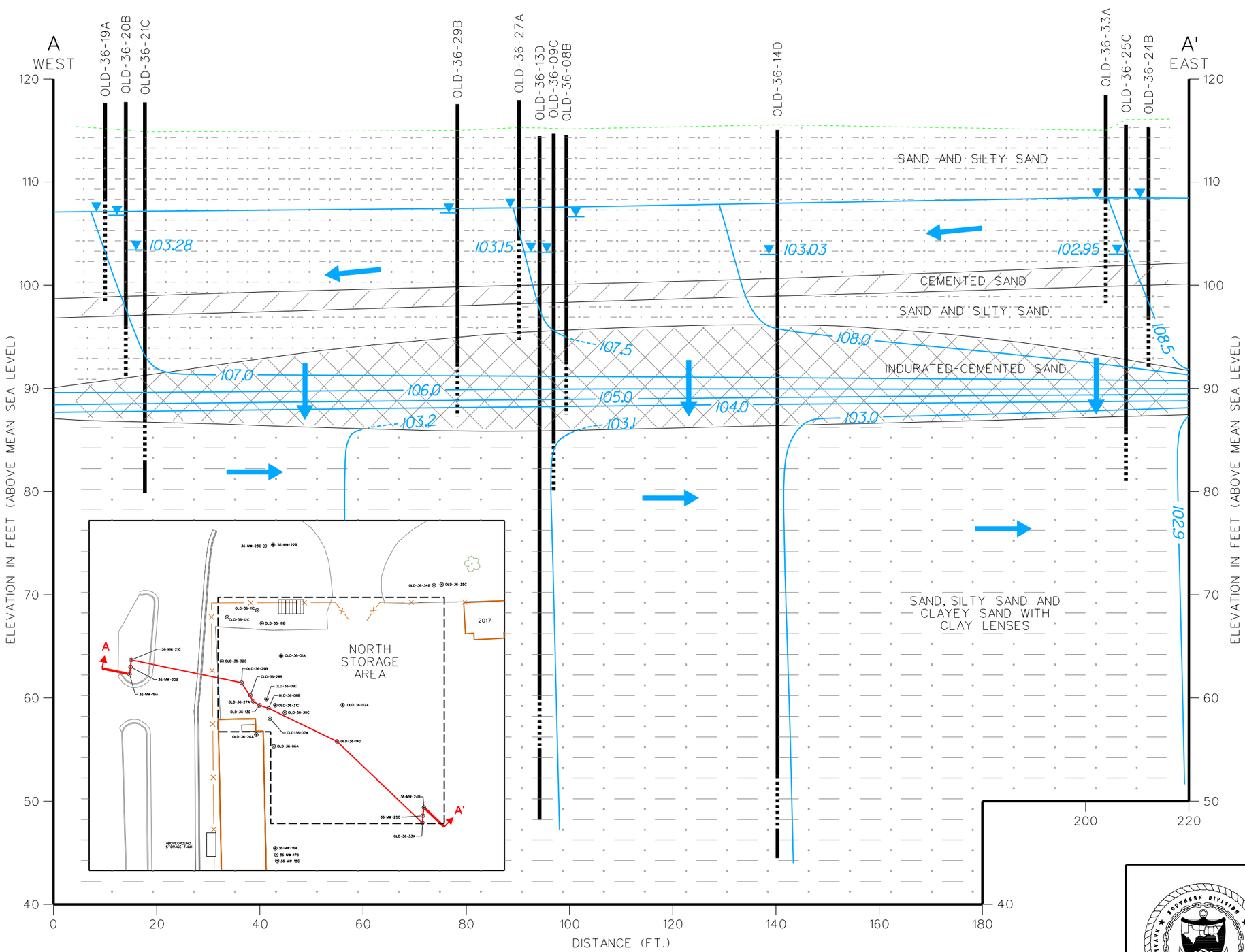
2.2 SITE GEOLOGY

The geology of the site was investigated during drilling for the construction of monitoring wells. The shallow geology at SA 36 consists of undifferentiated Pleistocene and Recent marine terrace deposits underlain by the Hawthorn Group. The undifferentiated sediments are about 65 feet in thickness and consist of gray to dark brown, predominantly quartz sand with varying amounts of silt and clay-sized grains, and shell fragments. The lithology of these sediments varies somewhat both laterally and vertically. An interval consisting of cemented fine sand, interbedded fine sand and silt, and indurated, cemented sand, locally called a “hardpan,” was encountered at a depth of from 15 to 25 feet below ground surface (bgs). Beneath the cemented sand interval is another unit of brown to dark brown, sand and silty sand with some clay lenses, and an interval containing shell fragments at about 60 feet bgs. Figure 2-1 shows a northwest by southeast cross section of the shallow sediments beneath SA 36.

The Hawthorn Group in the vicinity of SA 36 is typically described as gray-green, calcareous, phosphatic sandy clay, and includes clayey sand interbedded with thin, discontinuous lenses of phosphatic sand or limerock. The deepest borings at SA 36 showed a coarsening of the sand and a change to a green color at a depth of about 60 to 65 feet bgs (beneath the interval of shell fragments described above); this is interpreted to represent the top of the Hawthorn Group. A plastic, green clay interval followed by limestone was encountered at depths of about 66 to 70 feet bgs.

2.3 SITE HYDROGEOLOGY

The hydrogeology of the surficial aquifer of interest at SA 36 has been investigated by the installation and monitoring of wells installed at the site. A water table lies at a depth of about 7 to 14 feet bgs across the site, with 5 to 6 feet of seasonal variation observed in some wells. The surficial aquifer extends to a



CROSS SECTION A-A'

VERTICAL EXAGGERATION = 2 X HORIZONTAL

LEGEND

WELL

OLD-36-14D — WELL DESIGNATION

GROUND SURFACE

TOP OF SCREEN

GROUNDWATER LEVEL ON JULY 2001

BOTTOM OF SCREEN

BOTTOM OF BORING

107.0 — POTENTIOMETRIC CONTOUR (ELEV. IN FEET)

GROUNDWATER FLOW DIRECTION

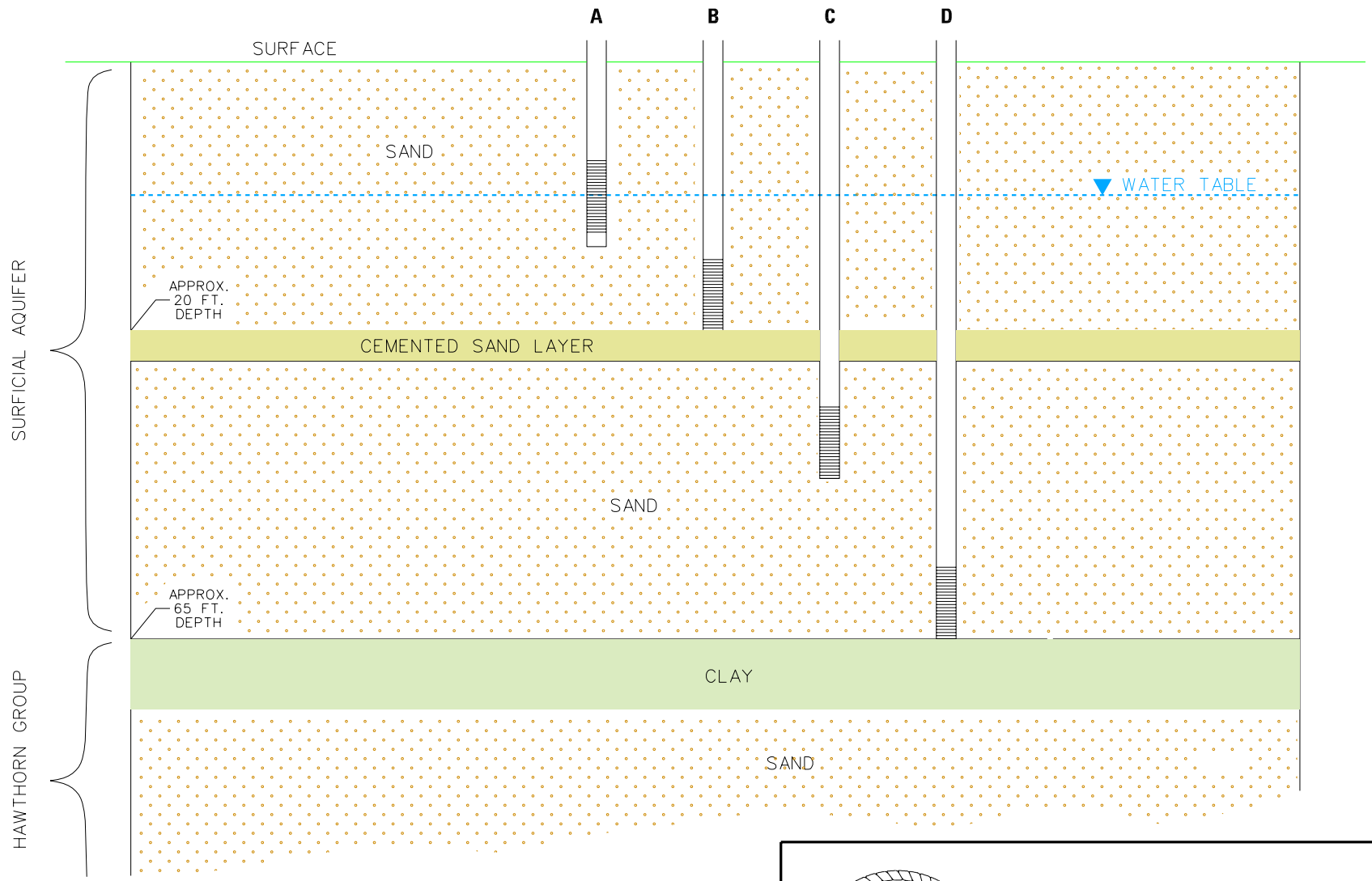
FIGURE 2-1
CROSS SECTION A-A'
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

n11x17h.dgn
CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-034.dgn 8-1-02 Site Inv. Report

depth of about 60 to 65 feet and the uppermost Hawthorn clay layer described in Section 2.2 defines its lower extent. Figure 2-2 provides a well depth schematic that demonstrates the relationship of the wells and the nomenclature used to distinguish the aquifer depth intervals at SA 36 (e.g., “A” and “B” wells screened above the cemented sand interval, “C” and “D” wells screened between the cemented sand and the Hawthorn Group sediments). Groundwater elevation data from periodic monitoring of water levels during the site investigation are summarized in Table 2-1. Comparison of groundwater elevations between wells screened above the cemented sand interval [e.g., OLD-36-27A (27A)] with a nearby well screened deeper in the aquifer (e.g., 13D) shows that the potentiometric surface above the cemented sand layer (i.e., A and B wells) is typically several feet higher than the potentiometric surface at deeper well intervals (C and D wells). Thus, a downward gradient is observed across the cemented sand interval, as shown in Figure 2-1.

Based on a site topographic elevation of approximately 115 feet above mean seal level (msl) and the proximity of Lake Susannah with a surface water elevation of approximately 91 feet above msl, the direction of groundwater flow in the surficial aquifer at SA 36 was expected to be eastward toward the lake. Using the data provided in Table 2-1, a series of potentiometric maps were constructed that display the groundwater flow direction at various depths in the aquifer (see discussion in Section 4.1). The potentiometric contour maps indicate that the groundwater flow direction above the cemented sand interval, in the A and B wells, is to the northwest. The direction of groundwater flow beneath the cemented sand interval, in the C wells, is toward the southeast. The northeast flow direction in the shallow wells is interpreted to result from the effects of a groundwater divide located to the east of site SA 36. The result is that local, shallow groundwater flow above the cemented sand interval at SA 36 does not follow the expected eastward aquifer flow direction, toward Lake Susannah, as observed in the C wells. Further discussion of the groundwater flow and contaminant transport at SA 36 is provided in Section 4.1.



NOT TO SCALE

FIGURE 2-2
WELL DEPTH SCHEMATIC
STUDY AREA 36 - NORTH STORAGE YARD

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

TABLE 2-1

GROUNDWATER ELEVATIONS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well	Well Type	Screened Interval (bgs)	TOC Elevation (AMSL)	8/22/00		3/16/01		4/5/01		7/30/01		10/20/01	
				Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)	Depth to Water (BTOC)	Groundwater Elevation (AMSL)
OLD-36-01A	2" PVC	7-17	114.86	9.10	105.76	12.22	102.64	10.19	104.67	7.16	107.70	6.19	108.67
OLD-36-02A	2" PVC	7-17	115.13	9.00	106.13	10.63	104.50	9.35	105.78	6.89	108.24	9.09	106.04
OLD-36-06A	2" PVC	7-17	115.03	9.11	105.92	10.83	104.20	9.90	105.13	7.17	107.86	6.12	108.91
OLD-36-07A	2" PVC	15-20	114.85	9.00	105.85	10.88	103.97	9.90	104.95	7.20	107.65	6.10	108.75
OLD-36-08B	2" PVC	22.5-27.5	114.74	11.50	103.24	11.50	103.24	10.60	104.14	8.04	106.70	8.07	106.67
OLD-36-09C	2" PVC	30-35	114.78	13.55	101.23	14.75	100.03	14.18	100.60	11.65	103.13	10.26	104.52
OLD-36-10B	2" PVC	20-25	114.94	9.53	105.41	11.47	103.47	10.56	104.38	7.77	107.17	6.64	108.30
OLD-36-11C	2" PVC	30-35	114.78	13.05	101.73	14.87	99.91	14.13	100.65	11.59	103.19	10.10	104.68
OLD-36-12C	2" PVC	30-35	114.52	12.78	101.74	14.55	99.97	13.78	100.74	11.30	103.22	9.80	104.72
OLD-36-13D	2" PVC	61-66	114.74	13.05	101.69	14.91	99.83	14.12	100.62	11.59	103.15	13.09	101.65
OLD-36-14D	2" PVC	63-68	115.13	13.55	101.58	15.48	99.65	14.43	100.70	12.10	103.03	10.62	104.51
OLD-36-15A	2" PVC	5-15	119.44	12.49	106.95	14.20	105.24	13.08	106.36	11.06	108.38	9.93	109.51
OLD-36-16A	2" PVC	7-17	115.12	9.12	106.00	10.88	104.24	9.60	105.52	7.16	107.96	6.05	109.07
OLD-36-17B	2" PVC	19-24	115.22	9.31	105.91	10.88	104.34	10.10	105.12	7.23	107.99	6.15	109.07
OLD-36-18C	2" PVC	29.5-34.5	115.27	13.56	101.71	15.45	99.82	14.71	100.56	12.18	103.09	10.72	104.55
OLD-36-19A	2" PVC	6.9-16.9	117.71	12.30	105.41	14.22	103.49	13.51	104.20	10.65	107.06	9.36	108.35
OLD-36-20B	2" PVC	19.13-24.13	117.77	12.74	105.03	14.30	103.47	13.51	104.26	10.88	106.89	9.56	108.21
OLD-36-21C	2" PVC	28-32	117.80	15.85	101.95	17.98	99.82	17.04	100.76	14.52	103.28	12.98	104.82
OLD-36-22B	2" PVC	19.56-24.56	118.99	12.87	106.12	15.02	103.97	14.16	104.83	11.47	107.52	10.32	108.67
OLD-36-23C	2" PVC	29.3-34.3	118.00	16.17	101.83	18.10	99.90	17.36	100.64	14.81	103.19	13.28	104.72
OLD-36-24B	2" PVC	19-24	115.78	9.65	106.13	11.42	104.36	9.60	106.18	7.34	108.44	6.54	109.24
OLD-36-25C	2" PVC	29.5-34.5	115.70	14.11	101.59	15.98	99.72	15.23	100.47	12.75	102.95	11.29	104.41
OLD-36-26A	2" PVC	10.7 - 20.7	117.89	NI	-	13.82	104.07	12.89	105.00	10.14	107.75	9.06	108.83
OLD-36-27A	2" PVC	10.7 - 20.7	118.02	NI	-	14.27	103.75	13.48	104.54	10.46	107.56	6.30	111.72
OLD-36-28B	2" PVC	22.3 - 27.3	117.97	NI	-	14.86	103.11	14.17	103.80	11.32	106.65	9.96	108.01
OLD-36-29B	2" PVC	22.7 - 27.7	117.63	NI	-	14.25	103.38	13.48	104.15	10.62	107.01	9.36	108.27
OLD-36-30C	2" PVC	30.5 - 35.5	117.94	NI	-	18.12	99.82	NM	-	14.85	103.09	13.36	104.58
OLD-36-31C	2" PVC	30.5 - 35.5	117.81	NI	-	17.97	99.84	NM	-	14.72	103.09	13.21	104.60
OLD-36-32C	2" PVC	30.2 - 35.2	117.99	NI	-	18.07	99.92	17.33	100.66	14.81	103.18	13.30	104.69
OLD-36-33A	2" PVC	8.0 - 18.0	118.49	NI	-	14.11	104.38	12.65	105.84	9.99	108.50	6.20	112.29
OLD-36-34B	2" PVC	20.4 - 25.4	118.43	NI	-	14.10	104.33	NM	-	10.04	108.39	6.23	112.20
OLD-36-35C	2" PVC	30.2 - 35.2	118.25	NI	-	18.04	100.21	NM	-	15.05	103.20	13.51	104.74
OLD-36-36C	2" PVC	29.9 - 35.9	118.82	NI	-	19.22	99.60	18.45	100.37	15.93	102.89	14.48	104.34
OLD-36-37C	2" PVC	30.0 - 35.0	117.01	NI	-	16.68	100.33	16.25	100.76	13.74	103.27	12.19	104.82

Notes:
All measurements are in units of feet.
AMSL - Above mean sea level
bgs - Below ground surface
BTOC - Below top of casing
NI - Not installed
NM - Not measured
PVC - polyvinyl chloride
TOC - Top of casing

3.0 SITE INVESTIGATION AND REMEDIAL ACTIVITIES

3.1 SITE SCREENING

HLA conducted initial and supplemental site screening activities at SA 36 between July 1997 and October 1998. The activities included a passive soil gas survey, soil sampling, monitoring well installation, direct push technology (DPT) groundwater sampling, and groundwater monitoring well sampling. HLA presented the details of the site screening activities in a report titled *Base Realignment and Closure Environmental Site Screening Report, Study Area 36, Naval Training Center, Orlando, Florida* (HLA, 1999).

3.1.1 Soil Gas Survey

HLA conducted a passive soil gas survey over the storage areas, the drainage swale, and the western part of the Public Works Yard in August 1997. A grid with nodes spaced 50 feet apart was established and 56 passive collectors were buried 2 feet bgs at the nodes of the grid. After a 2-week exposure period, the passive collectors were retrieved and analyzed for volatile organic constituents (USEPA Method 8260). One passive sampler that was installed about 60 feet northeast of Building 2122 detected an elevated concentration of tetrachloroethene (PCE). No other significant anomalies were noted.

3.1.2 Soil Sampling

HLA collected surface and subsurface soil samples during the October and November 1997 installation of six shallow monitoring wells OLD-36-01A (01A) through 06A. Composite surface soil samples were collected in the 0–2-foot bgs interval. Subsurface soil samples were collected from the 6–8-foot bgs interval, immediately above the water table. Soil samples with elevated concentrations of mercury, barium, arsenic, antimony, benzo(*a*)pyrene, and total recoverable petroleum hydrocarbons (TRPH) were noted throughout the site. The soil sampling results obtained during the site screening are summarized in Figure 3-1.

3.1.3 Groundwater Sampling

HLA installed and sampled six shallow groundwater monitoring wells in October and November 1997 (01A through 06A). The groundwater sampling results that exceeded screening criteria during the initial site screening are presented with the soil sampling results in Figure 3-1. A sample from well 06A contained 19 µg/L of trichloroethene (TCE), exceeding the current FDEP Groundwater Cleanup Target Level (GCTL) of 3 µg/L (FDEP, 1999).

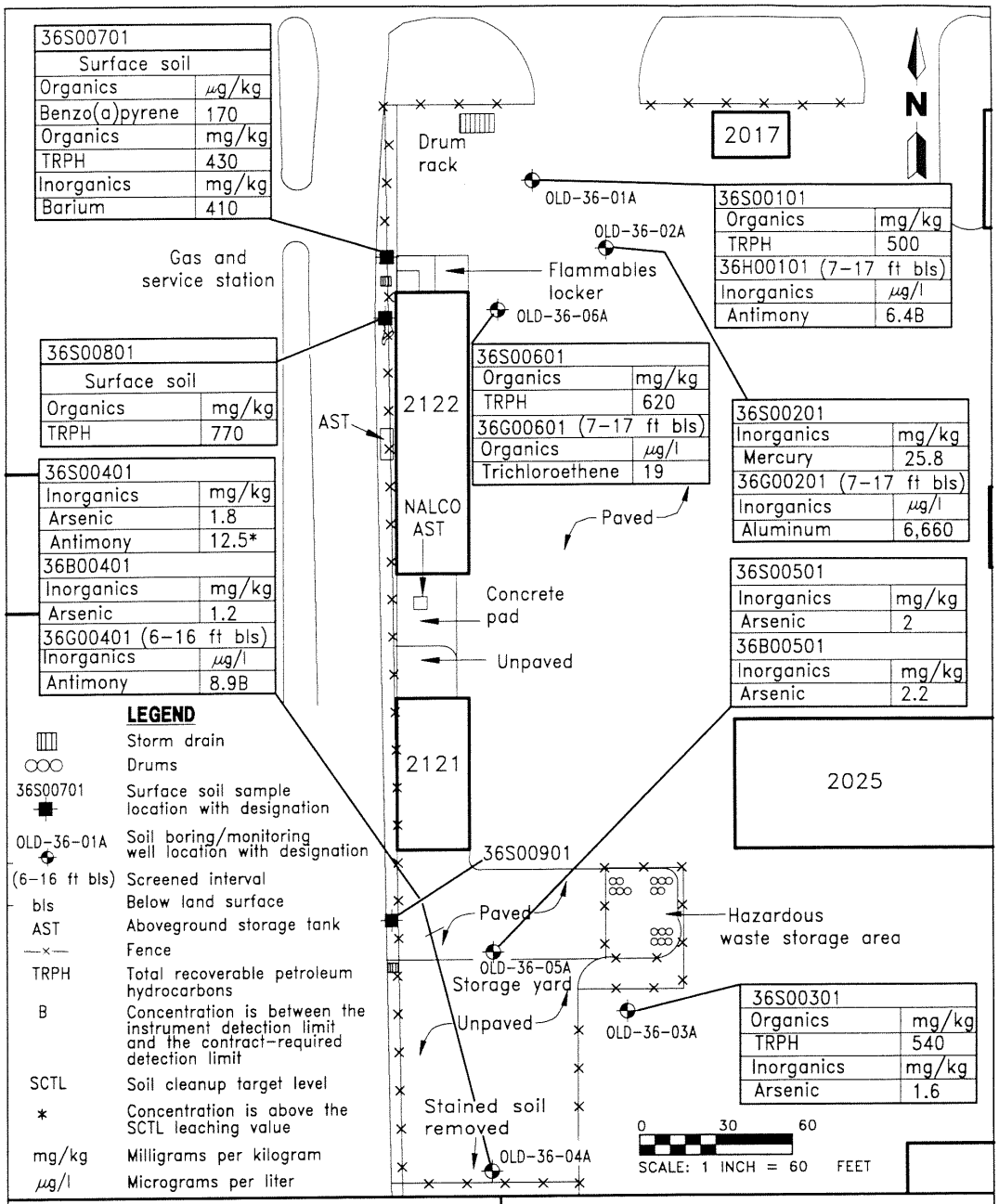


Figure 3-1
SURFACE SOIL, SOIL BORING, AND MONITORING WELL LOCATIONS

BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING REPORT, STUDY AREA 36

NAVAL TRAINING CENTER ORLANDO, FLORIDA

Source: HLA, 1999

HLA installed five additional wells in June 1998 (07A, 08B, 09C, 10B, and 11C) and three additional wells in October 1998 (12C, 13D, and 14D). These wells were installed in the North Storage Area to further define the extent of contamination. Figures 3-2 and 3-3 present the results of groundwater sampling events conducted in June 1998 and December 1998, respectively. Samples from six wells exceeded the GCTLs for the chlorinated solvents TCE or PCE, with the highest concentration (300 µg/L) for TCE.

Groundwater samples from monitoring wells 01A and 04A located in the North and South Storage Areas contained concentrations of antimony that slightly exceeded the FDEP GCTL of 6 µg/L, and the aluminum concentration in well 02A exceeded the background screening value (BGSV) of 4,067 µg/L established in a background sampling report prepared for the NTC Main Base (ABB, 1995b). Examination of the field and analytical data indicated that the elevated concentrations of antimony and aluminum probably resulted from suspended solids in the samples.

3.1.4 Natural Attenuation Sampling and Evaluation

The detection of degradation products of PCE [i.e., TCE and dichloroethene (DCE)] in groundwater suggested that biodegradation by native organisms, a form of natural attenuation, might be occurring at in the North Storage Area at SA 36. In December 1998, 11 of the wells (1A, 2A, 6A, 7A, 8B, 9C, 10B, 11C, 12C, 13D, and 14D) were sampled for natural attenuation parameters. The wells sampled included upgradient, in-plume, and downgradient locations at each aquifer depth.

Colorimetric tests may be influenced by sample color, so turbidity was monitored during well purging. Excessively turbid samples were passed through a 0.45-micron filter prior to testing. HLA used the data to evaluate the potential for natural attenuation in the contaminated groundwater using a protocol developed for the Air Force Center for Environmental Excellence and published by USEPA Region 4 (Wiedemeier et al., 1997). Details of the sampling and analyses are provided in the Site Screening Report (HLA, 1999).

3.2 SITE INVESTIGATION

TtNUS conducted additional soil and groundwater sampling during April and August 2000 to accomplish the following objectives:

- Confirm and define the horizontal extent of mercury, barium, arsenic, antimony, and TRPH contamination in surface soil.
- Define the lateral and vertical extent of antimony and chlorinated solvents in groundwater.

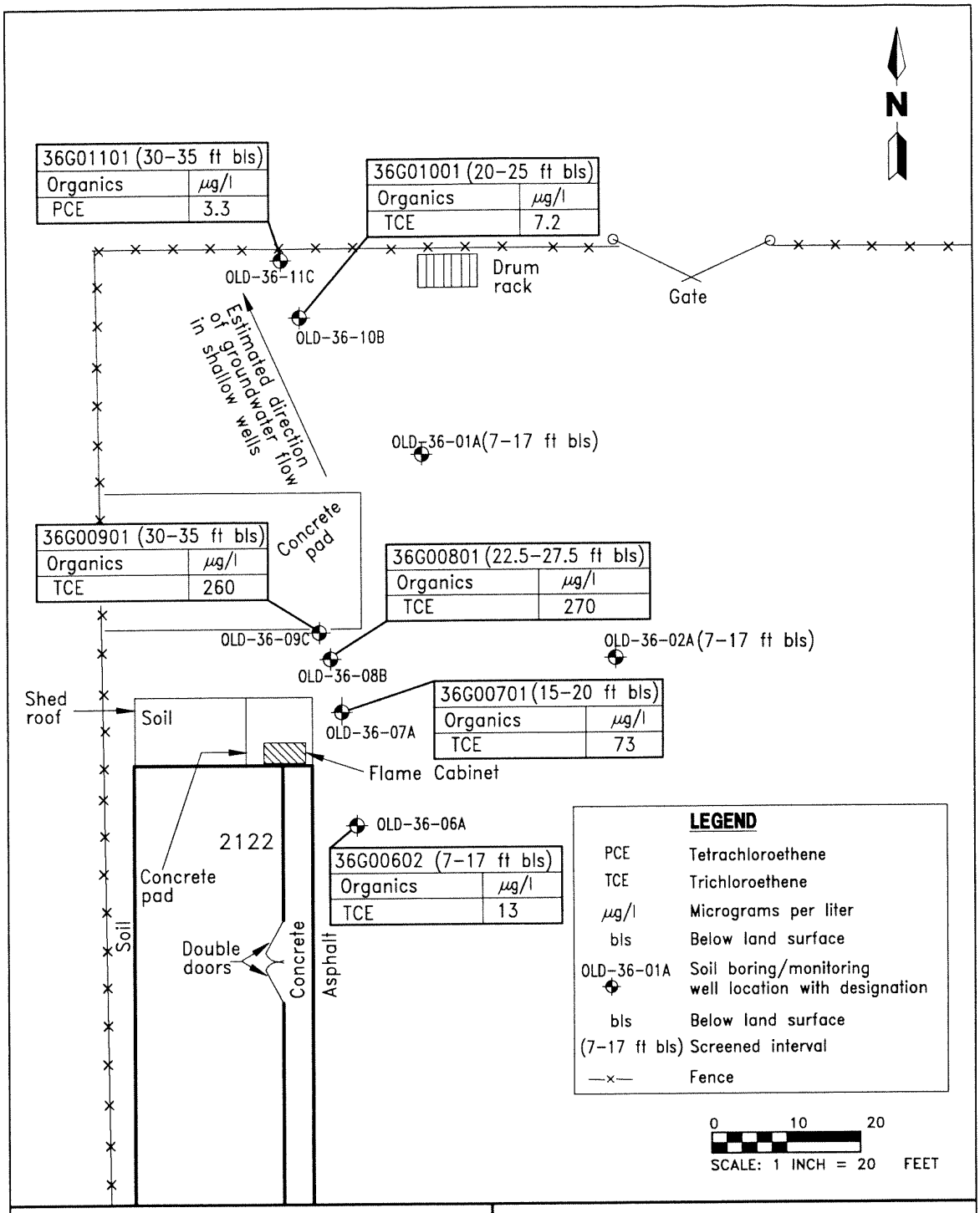


FIGURE 3-2
GROUNDWATER ORGANIC EXCEEDANCES
SECOND ROUND OF MONITORING
WELL SAMPLING (JUNE 1998)

K:\02530\02530-09\SSR\02530855.DWG, SM-VC 03/23/99 16:59:23, AutoCAD R14

BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING REPORT, STUDY AREA 36

NAVAL TRAINING CENTER ORLANDO, FLORIDA

Source: HLA, 1999

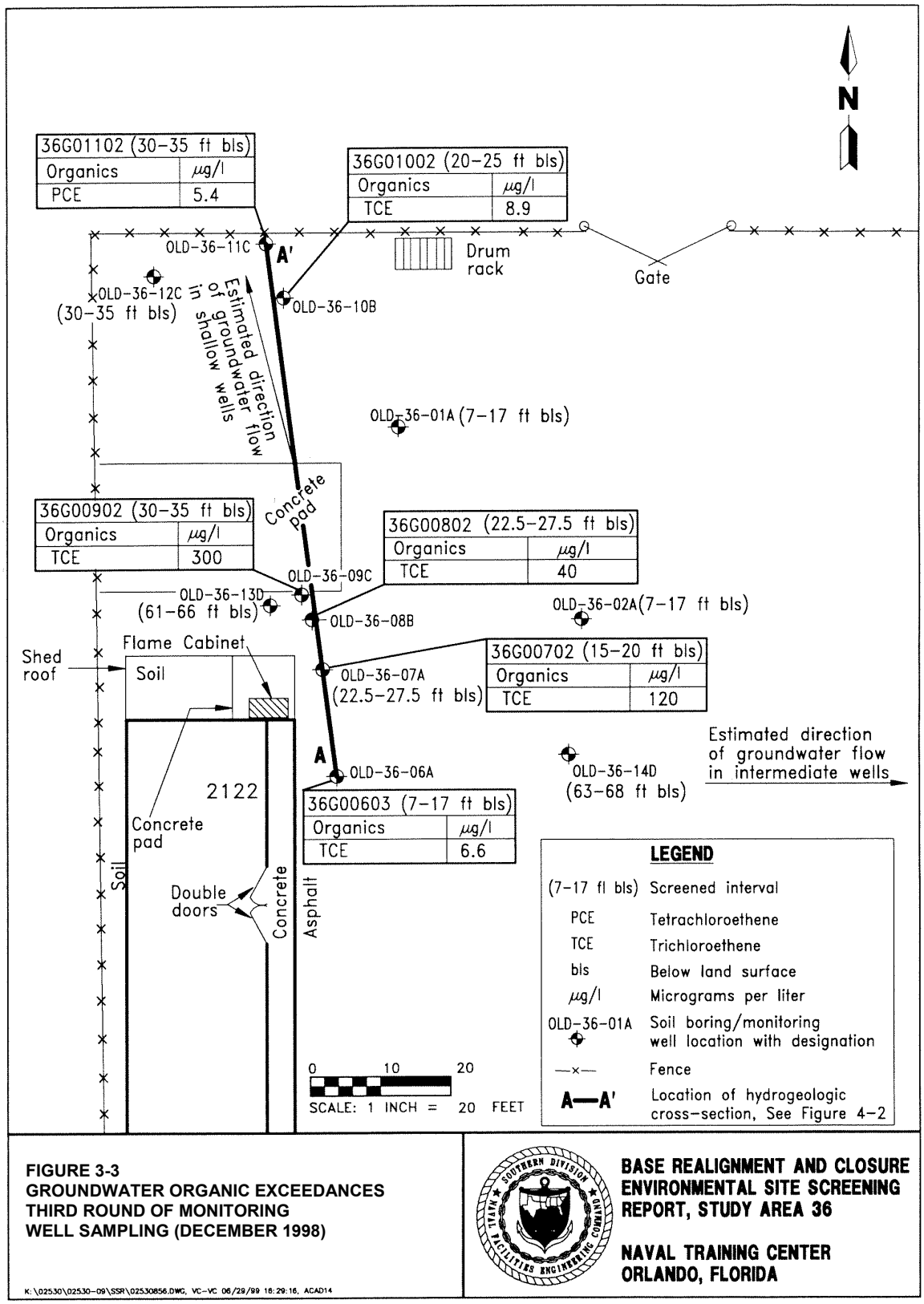


FIGURE 3-3
GROUNDWATER ORGANIC EXCEEDANCES
THIRD ROUND OF MONITORING
WELL SAMPLING (DECEMBER 1998)

K:\02530\02530-09\SSR\02530856.DWG, VC-VC 06/29/99 16:29:16, ACAD14

BASE REALIGNMENT AND CLOSURE
ENVIRONMENTAL SITE SCREENING
REPORT, STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Source: HLA, 1999

TtNUS performed the work in accordance with the *Work Plan for the Investigation of Contaminated Soil and Groundwater, Study Area 36* (TtNUS, 2000). The Work Plan references the guidance detailed in the *Project Operations Plan* [POP] *for Site Investigations and Remedial Investigations*, Volume 1 (ABB-ES, 1997). Health and safety aspects of the work at SA 36 were controlled in accordance with the *Health and Safety Plan for Completion of Investigative Work and Data Sampling* (B&RE, 1997) and addenda.

To complete the definition of the SA 36 groundwater plume, both CCI and the developer's consultant, Nodarse, installed and sampled monitoring wells from November 2000 through April 2002. Procedures similar to those specified in the POP were followed by the two contractors. The sample data were forwarded to TtNUS for validation and evaluation and are presented in this report.

3.2.1 Soil Sampling

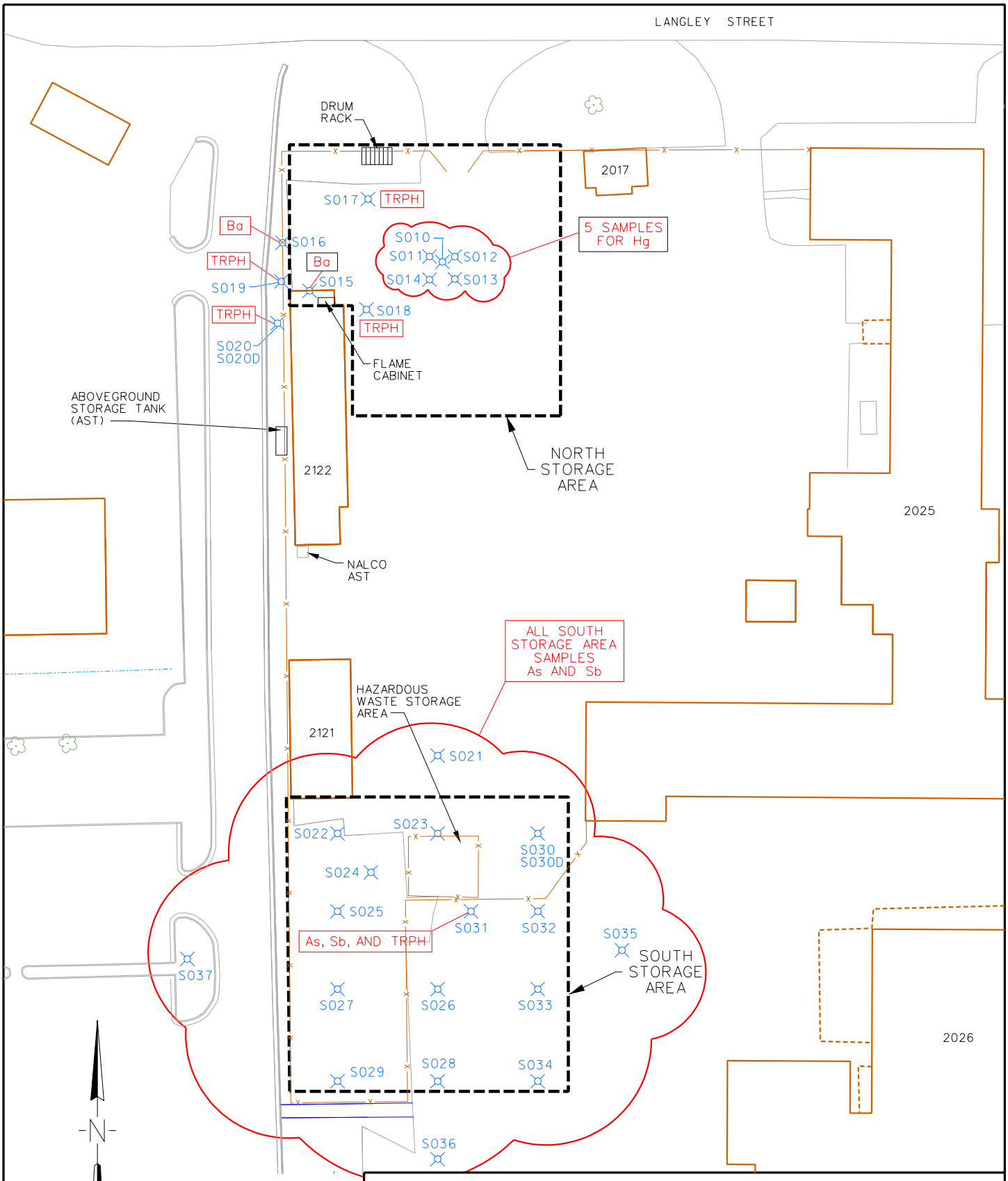
In April 2000, TtNUS collected 28 additional surface soil samples to confirm and define the horizontal extent of mercury, barium, arsenic, antimony, and TRPH contamination near locations where previous detections in surface soil exceeded screening criteria to assess the possible need for soil removal actions. Figure 3-4 shows the sampling locations. The samples were analyzed in accordance with USEPA Level IV Data Quality Objectives (DQOs) by Severn Trent Laboratories in North Canton, Ohio. Sample analytes were selected in each area according to the exceedances reported in the initial site screening. Five samples that were collected in the North Storage Area near well 2A were analyzed for mercury. A sample from the drainage swale, north of the storm drain adjacent to the Paint Shop (Building 2122) and another collected at the north end of Building 2122 were analyzed for barium. In the South Storage Area, 17 samples were collected in the area surrounding former wells 3A, 4A, and 5A and analyzed for arsenic and antimony. One of those samples was also analyzed for TRPH. Five samples from formerly paved areas in the North Storage Area and the South Storage Area were analyzed for TRPH.

Soil Sample Numbering

The soil samples were numbered as follows:

NTC36*TNNNDD*

where:	NTC	=	Naval Training Center
	36	=	two-digit SA designation (36)
	T	=	sample type ("S" for surface soil, "D" for duplicate)
	NNN	=	location number (e.g., 001 or 015)
	DD	=	sample depth (e.g., 01 or 02)



60 0 60

SCALE IN FEET

SOURCE:
ROADS, BUILIDINGS, ETC. ARE FROM A PHOTOGRAMMETRIC SURVEY BY DEMAPS, INC. AND REPS, INC. IN 1997.

FIGURE 3-4
SOIL SAMPLING LOCATIONS
APRIL 2000
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-038.dgn 8-1-02 Site Inv. Report

n8_5x11v.dgn

For example, the sample collected at the 5th soil location at a depth of 2 feet was designated NTC36S00502. Samples for field duplicates were identified with a "blind" number (e.g., NTC36D1000). The corresponding environmental sample was noted in the field logbook.

Quality Control Samples

Quality control samples were collected at the frequencies listed below.

- One field duplicate per 10 environmental samples.
- One matrix spike/matrix spike duplicate (MS/MSD) per 20 environmental samples.

MS/MSD was added to the sample number on the labels and the chain of custody. Additional sample volume was collected for each MS and MSD. No reusable equipment was used for sampling; thus, decontamination and collection of associated rinsate and field blanks were not required.

3.2.2 Groundwater Sampling

Monitoring Well Installation

Tetra Tech NUS. TtNUS installed well 15A in the South Storage Area near the former location of well 04A that contained an exceedance of antimony. Well 15A and the 11 wells in the North Storage Area were then sampled in April 2000. All samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs). The samples from wells 1A in the North Storage Area and 15A were also analyzed for antimony to assess the likelihood that the exceedances observed during the initial screening were due to elevated turbidity in the samples. The April 2000 results indicated that the extent of the groundwater VOC contamination in the North Storage Yard was defined to the east and northeast in Zone A, but not defined in the other directions. The lateral limits of VOC contamination were not defined in Zones B and C.

In August 2000, TtNUS installed and sampled ten additional wells (16A through 25C) in the North Storage Area to define the limits of the VOC contaminant plume. The wells were screened at depths up to 35 feet bgs. The results of the August 2000 sampling combined with the April 2000 data provided sufficient information to define the limits of the VOC plume in Zone A in both crossgradient directions (northeast and southwest), but not in the upgradient or downgradient directions. In Zone B, the VOC plume was defined in the upgradient and in both crossgradient directions, but not in the downgradient direction (northwest). The plume limits in Zone C were defined in one crossgradient direction (southwest), but the remainder of the plume was not defined.

CH2M Hill Constructors. In November 2000, CCI installed wells 33A through 37C to complete delineation of the plume, while installing other wells to monitor the progress of the IRA. The wells were sampled in March 2001 and analyzed for VOCs. CCI forwarded the laboratory data packages to TtNUS for data validation. The results indicated that the limits of the plume were defined for Zone C. In Zones A and B, the plume limits were defined except in the downgradient (northwest) direction. The new wells installed during August and November 2000 provided additional groundwater potentiometric maps at each aquifer depth. These maps revealed subtle but significant changes in the groundwater flow direction that were not previously understood.

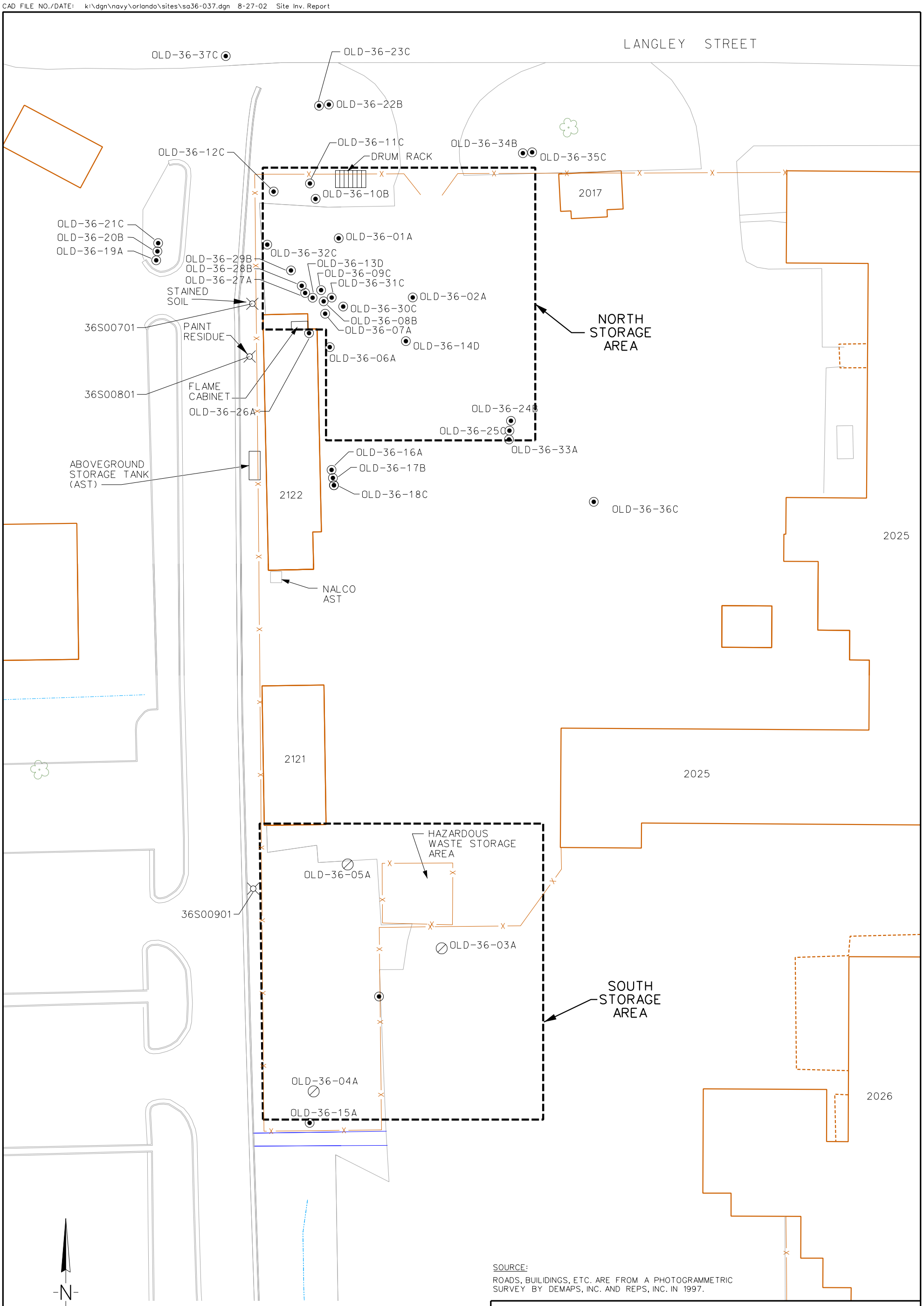
Nodarse & Associates. All wells at the site were abandoned by Nodarse in December 2001 as part of the site re-development. Seventeen replacement wells were subsequently installed and sampled in April and May 2002. Of these 17 replacement wells, 01AR and 10BR were installed to investigate the downgradient extent of the TCE plume in Zones A and B. Figure 3-5 shows the locations of all wells installed at SA 36 through November 2000 plus replacement wells 01AR and 10BR. Table 3-1 is a comprehensive list of wells that were installed at the site and subsequently abandoned, as well as the new replacement wells.

Monitoring Well Construction

All monitoring wells installed for the site investigation were constructed of Schedule 40, flush-joint threaded, 2-inch-ID polyvinyl chloride (PVC) pipe and flush-joint threaded, factory-slotted 0.010-inch well screen with a threaded end cap. Each section of well casing and screen was certified as compliant with the National Sanitation Foundation standards. The shallow, A-depth well screens were 10 feet long to allow for potential water table fluctuation; the well screens were 5 feet long for all other well depths (i.e., B and C). The bottoms of the well screens were placed a minimum of 6 inches, but no more than 3 feet, above the bottom of the drilled borehole. Bottom plugs were flush threaded. No solvents or glues were used during construction of monitoring wells.

A minimum 1-foot-thick layer of fine sand (uniformly graded with 100 percent by weight passing the No. 30 U.S. Standard sieve, and less than 2 percent by weight passing the No. 200 U.S. Standard sieve) was placed on top of the filter pack. Except for the A wells, a minimum 2-foot-thick bentonite pellet seal was installed above the fine sand pack and allowed to hydrate as per the manufacturer's recommendations. Only 100 percent, certified pure, sodium bentonite was used for well construction. For the A monitoring wells (approximately 15 feet bgs), the top of the screen was above the static water level. Therefore, no bentonite seal was installed. Instead, the fine sand layer was increased in thickness to a minimum of 2 feet. The depth of backfill materials was frequently monitored during well installation

n11x17v.dgn



SOURCE:
ROADS, BUILIDINGS, ETC. ARE FROM A PHOTOGRAMMETRIC SURVEY BY DEMAPS, INC. AND REPS, INC. IN 1997.

FIGURE 3-5
MONITORING WELL LOCATIONS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

TABLE 3-1

**MONITORING WELL DATA
STUDY AREA 36**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

PAGE 1 OF 2

Well Designation	Date Installed	Installed by	Type*	Screened Interval (feet bgs)	Location**		TOC Elevation (feet AMSL)
					Easting	Northing	
OLD-36-01A	8-Oct-97	HLA	2" well	7 - 17	549,523.96	1,537,920.52	114.86
OLD-36-02A	8-Oct-97	HLA	2" well	7 - 17	549,557.01	1,537,894.04	115.13
OLD-36-03A	8-Oct-97	HLA	2" well	6 - 16	549,569.97	1,537,603.18	116.02
OLD-36-04A	8-Oct-97	HLA	2" well	6 - 16	549,512.75	1,537,539.23	116.35
OLD-36-05A	8-Oct-97	HLA	2" well	6 - 16	549,527.94	1,537,640.60	116.06
OLD-36-06A	8-Oct-97	HLA	2" well	7 - 17	549,519.96	1,537,871.85	115.03
OLD-36-07A	17-Jun-98	HLA	2" well	15 - 20	549,517.90	1,537,886.80	114.85
OLD-36-08B	17-Jun-98	HLA	2" well	22.5 - 27.5	549,517.20	1,537,892.30	114.74
OLD-36-09C	17-Jun-98	HLA	2" well	30 - 35	549,516.10	1,537,897.30	114.78
OLD-36-10B	17-Jun-98	HLA	2" well	20 - 25	549,513.60	1,537,938.10	114.94
OLD-36-11C	18-Jun-98	HLA	2" well	30 - 35	549,511.10	1,537,945.00	114.78
OLD-36-12C	27-Oct-98	HLA	2" well	30 - 35	549,494.90	1,537,941.40	114.52
OLD-36-13D	28-Oct-98	HLA	2" well	62 - 67	549,512.30	1,537,893.90	114.74
OLD-36-14D	28-Oct-98	HLA	2" well	63 – 68	549,554.00	1,537,874.50	115.13
OLD-36-15A	11-Apr-00	TtNUS	2" well	5 - 15	549,510.97	1,537,525.14	119.44
OLD-36-16A	14-Aug-00	TtNUS	2" well	7 - 17	549,520.79	1,537,817.00	115.12
OLD-36-17B	14-Aug-00	TtNUS	2" well	19 - 24	549,521.35	1,537,813.36	115.22
OLD-36-18C	14-Aug-00	TtNUS	2" well	29.5 - 34.5	549,521.82	1,537,810.10	115.27
OLD-36-19A	14-Aug-00	TtNUS	2" well	6.9 - 16.9	549,442.41	1,537,910.66	117.71
OLD-36-20B	15-Aug-00	TtNUS	2" well	19.1 - 24.1	549,442.94	1,537,914.62	117.77
OLD-36-21C	15-Aug-00	TtNUS	2" well	28 - 33	549,443.26	1,537,918.28	117.80
OLD-36-22B	15-Aug-00	TtNUS	2" well	19.6 - 24.6	549,519.59	1,537,980.29	118.99
OLD-36-23C	15-Aug-00	TtNUS	2" well	29 - 34	549,515.19	1,537,979.72	118.00
OLD-36-24B	14-Aug-00	TtNUS	2" well	19 - 24	549,600.88	1,537,838.87	115.78
OLD-36-25C	16-Aug-00	TtNUS	2" well	30 - 35	549,600.26	1,537,834.51	115.70
OLD-36-26A	8-Nov-00	CCI	2" well	10.7 - 20.7	549,510.67	1,537,878.13	117.89
OLD-36-27A	8-Nov-00	CCI	2" well	10.7 - 20.7	549,508.93	1,537,896.05	118.02
OLD-36-28B	10-Nov-00	CCI	2" well	22.3 - 27.3	549,507.42	1,537,899.26	117.97
OLD-36-29B	10-Nov-00	CCI	2" well	22.7 - 27.7	549,502.66	1,537,906.11	117.63
OLD-36-30C	9-Nov-00	CCI	2" well	30.5 - 35.5	549,525.96	1,537,889.96	117.94
OLD-36-31C	14-Nov-00	CCI	2" well	30.5 - 35.5	549,520.86	1,537,893.95	117.81
OLD-36-32C	14-Nov-00	CCI	2" well	30.2 - 35.2	549,492.02	1,537,917.64	117.99
OLD-36-33A	14-Nov-00	CCI	2" well	8 - 18	549,600.01	1,537,830.60	118.49
OLD-36-34B	14-Nov-00	CCI	2" well	20.4 - 25.4	549,606.22	1,537,958.50	118.43
OLD-36-35C	14-Nov-00	CCI	2" well	30.2 - 35.2	549,610.39	1,537,958.94	118.25
OLD-36-36C	15-Nov-00	CCI	2" well	29.9 - 34.9	549,637.94	1,537,802.71	118.82
OLD-36-37C	9-Nov-00	CCI	2" well	30 - 35	549,473.52	1,538,001.90	117.01
OLD-36-01AR	20-Apr-02	Nodarse	2" well	8.12– 18.2	549,500.75	1,537,944.63	117.19
OLD-36-02AR	29-Apr-02	Nodarse	2" well	5.9 – 15.9	549,528.51	1,537,979.36	116.90
OLD-36-07AR	24-May-02	Nodarse	2" well	5.6 – 15.6	549,527.90	1,537,896.16	116.93
OLD-36-08BR	24-May-02	Nodarse	2" well	13.6 – 18.6	549,525.33	1,537,888.80	114.90

TABLE 3-1

MONITORING WELL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 2 OF 2

Well Designation	Date Installed	Installed by	Type*	Screened Interval (feet bgs)	Location**		TOC Elevation (feet AMSL)
					Easting	Northing	
OLD-36-09CR	28-May-02	Nodarse	2" well	27.1 – 32.1	549,523.79	1,537,884.94	114.50
OLD-36-10BR	20-Apr-02	Nodarse	2" well	16.9 – 21.9	549,506.06	1,537,944.97	118.34
OLD-36-11CR	22-May-02	Nodarse	2" well	27.6 – 32.6	549,503.20	1,537,949.16	119.08
OLD-36-18CR	29-May-02	Nodarse	2" well	26.8 – 31.8	549,485.73	1,537,805.46	115.38
OLD-36-19AR	1-May-02	Nodarse	2" well	7.4 – 17.4	549,443.90	1,537,909.92	117.41
OLD-36-20BR	1-May-02	Nodarse	2" well	18.4 – 23.4	549,444.00	1,537,914.20	117.39
OLD-36-22BR	29-Apr-02	Nodarse	2" well	15 - 20	549,531.55	1,537,983.82	117.72
OLD-36-23CR	29-Apr-02	Nodarse	2" well	28 - 33	549,534.13	1,537,987.62	114.69
OLD-36-24BR	30-Apr-02	Nodarse	2" well	18.1 – 23.1	549,648.73	1,537,828.82	117.18
OLD-36-25CR	29-Apr-02	Nodarse	2" well	28.6 – 33.6	549,585.01	1,537,845.36	117.01
OLD-36-33AR	30-Apr-02	Nodarse	2" well	7.7 – 17.1	549,646.95	1,537,824.33	118.20
OLD-36-35CR	29-Apr-02	Nodarse	2" well	29.3 – 34.3	549,674.58	1,537,878.57	120.47
OLD-36-36CR	30-Apr-02	Nodarse	2" well	29.8 – 34.8	549,651.00	1,537,834.12	120.08

* All wells were constructed of 2-inch Schedule 40 polyvinyl chloride.
** Florida State Plane Coordinates, Florida East Zone
bgs = below ground surface
TOC = top of casing
AMSL = above mean sea level

using a weighted stainless steel or fiberglass tape measure. The remaining annulus above the hydrated bentonite seal (or above the fine sand layer in A wells) was backfilled to the surface, using a tremie pipe, with a 20:1 cement/bentonite grout. A maximum of 10 gallons of water per 94-pound bag of Type I cement was used for the grout. A protective steel surface casing with locking cap and concrete pad was completed around each well head. Well boring and completion logs are provided in Appendix A.

Preliminary well development was conducted during well construction by gently surging the well with a surge block to facilitate settlement of the filter pack sand around the well screen. After the level of the filter pack sand was stabilized, the remaining grout and seal materials were added to the annulus of the well. Final well development was performed no sooner than 24 hours after well installation. This development consisted of bailing and surging, and/or pumping, to restore the hydraulic properties of the borehole wall and to remove mobile fines from the filter pack and disturbed formation. This process continued until the site geologist determined that no additional increase in water clarity or reduction in turbidity could be achieved.

Split Spoon Sampling

Split spoon soil samples were collected only from the deepest boring at each well cluster location. The samples were collected to facilitate the description of the lithologies present at the site, to identify potential low-permeability layers, and to collect samples for geotechnical analyses. The split spoon samples were collected at 5-foot depth intervals from the ground surface to the terminal depth of the boring. The samples were monitored with an organic vapor analyzer, but no soil samples were collected for chemical analyses.

Groundwater Sampling

Monitoring wells were sampled using the low-flow or micro-purge technique and were analyzed by the laboratory for VOCs using USEPA Method 8260B. The samples from wells 01A and 15A were also analyzed for antimony using USEPA Method 6010B. Before sampling, the static groundwater level in each well was measured. Samples were collected and analyzed in accordance with USEPA Level IV DQOs. The work was performed in accordance with the site-specific work plan (Tetra Tech, 2000) and in accordance with the requirements of the POP (ABB-ES, 1997). The following summarizes the purging procedures used:

- The depth-to-water and total well depth were determined, and the discharge tubing was lowered into the well as slowly as possible to minimize disturbance to the water in the well.

- The end of the tubing was positioned near the midpoint of the saturated screen length and kept 2 to 3 feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well.

- Purging began with the pump at the lowest setting and the speed slowly increased until discharge occurred.

- The pumping rate was adjusted until there was little or no water level drawdown; the drawdown goal was a maximum of 0.3 foot. The water level in the well was monitored continuously until the pumping rate stabilized. Water level and pumping rate were monitored and recorded every 3 to 5 minutes (or as appropriate) during purging. Any pumping rate adjustments were recorded (both time and flow rate). Purging proceeded at approximately 100 mL/min, except where well-specific conditions warranted a change.

- The parameters listed below were monitored and were recorded on the sample purging/collection log (Appendix A). Purging was considered complete when all field parameters stabilized. Stabilization was considered to have been achieved when three consecutive readings, taken at 3- to 5-minute intervals, were within the limits listed below.

Temperature (°F)	± 5%
Specific conductance	± 5%
pH	± 5%
Oxidation-Reduction Potential (ORP/Eh)	± 5%
Dissolved Oxygen (DO)	± 5%
Turbidity	± 5% [values > 7 Nephelometric Turbidity Unit (NTU)]; ± 10% (values < 7 NTU)

Samples were collected immediately after purging was complete. Sample aliquots for volatile organics analyses were collected using the tube evacuation method described in Section 4.5.2.2 of the POP (ABB-ES, 1997); these samples were also collected directly into laboratory-supplied, preserved containers. The sample field parameters were recorded on the sample purging/collection log (Appendix B). All sample containers were immediately labeled, placed on ice in a shipping cooler, and kept under custody by the sample team. One trip blank set was included with each shipping container that included samples for VOC analyses.

Groundwater Sample Numbering

The monitoring well samples were numbered as follows:

NTC36*TWWWRR*

where:	NTC	=	Naval Training Center
	36	=	two-digit SA designation (36)
	T	=	sample type (“G” for groundwater, “D” for duplicate)
	WWW	=	well location and screen depth designation (e.g., 27A)
	RR	=	sampling round number (e.g., 10)

For example, the sample collected from well 27A was designated NTC36G27A10. Samples for field duplicates were identified with a "blind" number (e.g., NTC36D1000). The corresponding environmental sample was noted in the field logbook.

Quality Control Samples

Quality control samples were collected during the monitoring well sampling at the frequencies listed below.

- One field duplicate per 10 environmental samples.
- One trip blank set per cooler containing samples for VOC analysis.
- One MS/MSD per 20 environmental samples.

MS/MSD samples were identified on the labels and on the chain of custody. New sample numbers were not created for these samples. Additional sample volume was collected for each MS and MSD set.

3.3 INTERIM REMEDIAL ACTION

CCI began a groundwater IRA in the North Storage Area in November 2000. The IRA consisted of injecting vegetable oil into contaminated intervals of the aquifer to provide a carbon source (nutrient) for anaerobic organisms that degrade chlorinated solvents in groundwater. Additional details about the IRA may be found in the construction completion report (CCI, 2001) and the January 2002 IRA monitoring report (CCI, 2002).

CCI installed seven new monitoring wells in November 2000 to enhance monitoring of the natural attenuation process near the vegetable oil injection points (wells 26A through 32C). Vegetable oil injections were conducted in January 2001 and November 2001. CCI conducted baseline sampling in December 2000 and quarterly sampling in March 2001, July 2001, October 2001, and April/May 2002. Each sampling round included analyses for VOCs and selected natural attenuation parameters.

3.4 DATA VALIDATION

Site Investigation Laboratory Data

The analytical data for samples used in the site investigation to determine the extent of soil and groundwater contamination were subjected to a "full" validation equivalent to the former USEPA Level IV designation. The samples receiving the full validation include all of the soil and groundwater samples collected by TtNUS, the groundwater samples from monitoring wells 33A through 37C collected by CCI, and groundwater samples from replacement monitoring wells 01AR and 10BR, also collected by CCI. The validation was performed in accordance with the following guidance documents:

- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, 1999)
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, 1994)
- *Navy Installation Restoration Laboratory Quality Assurance Guide* (NFESC, 1996).

The data were reviewed for completeness, holding time compliance, calibration compliance, laboratory blank contamination, surrogate spike recovery, matrix spike recovery, blank spike recovery, internal standard response, sample quantitation, and detection limits.

IRA Laboratory Data

The analytical data for samples collected by CCI to monitor the progress of the groundwater IRA were subjected to a limited review using the *USEPA Contract Laboratory Program: National Functional Guidelines for Organic Data Review* (USEPA, 1999). The data were reviewed for data completeness, holding time compliance, calibration compliance, laboratory blank contamination, and detection limits.

4.0 SITE INVESTIGATION RESULTS

The results of the Site Investigation activities are presented and evaluated in this section. The validated analytical data from the Site Investigation are provided in Appendix C. Reference is made to the IRA data summarized in Section 5.0 and enclosed in Appendix D where useful to understanding the hydrogeological regime and defining the nature and extent of contamination at the site.

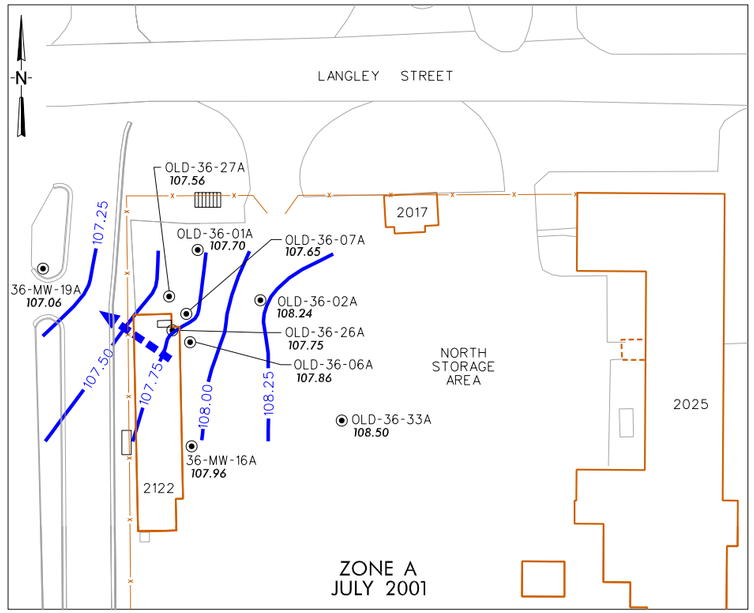
4.1 GROUNDWATER FLOW

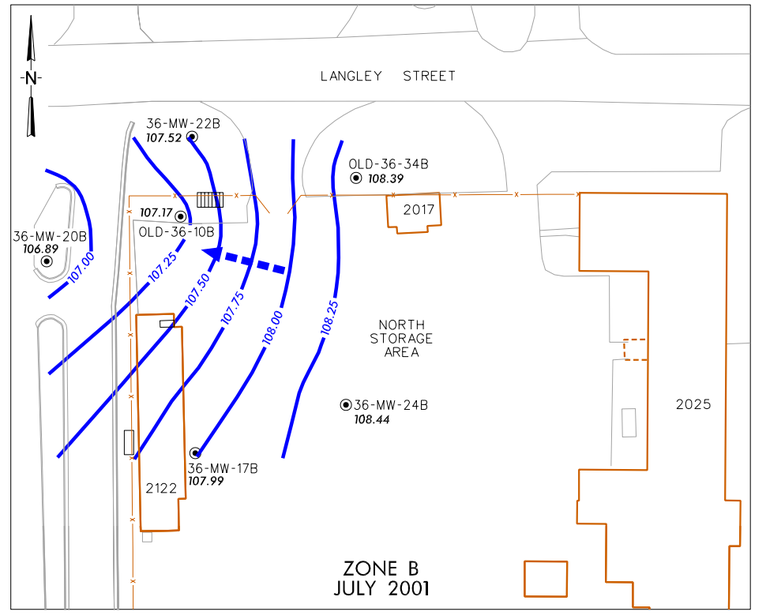
The geographic distribution of dissolved chemicals in groundwater, as evidenced by the results of monitoring well sampling and analyses, indicates that a groundwater plume consisting primarily of chlorinated chemicals is migrating to the northwest above the cemented sand interval and to the southeast below this interval. The vertical distribution of dissolved contaminants in groundwater, primarily TCE, indicates that vertical groundwater movement is also occurring. The site investigation data suggest that groundwater flow is the primary mechanism of contaminant migration at SA 36.

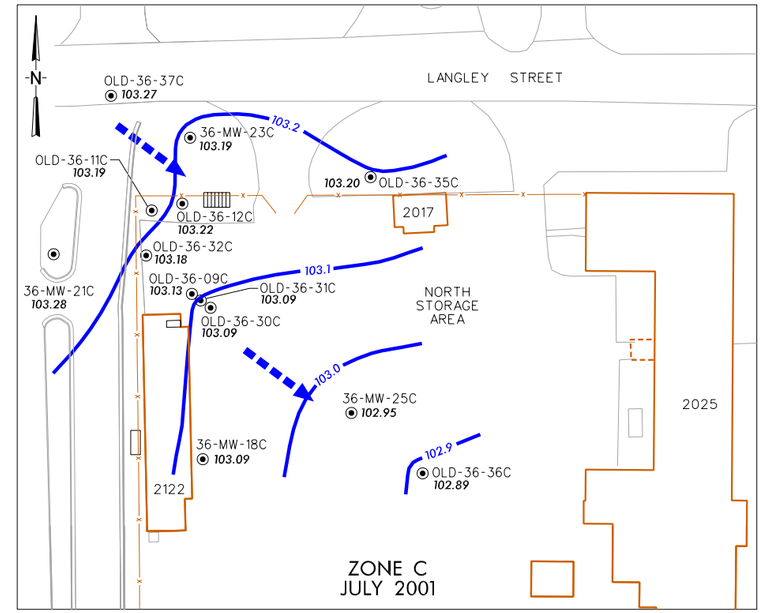
4.1.1 Groundwater Data (2000-2001)

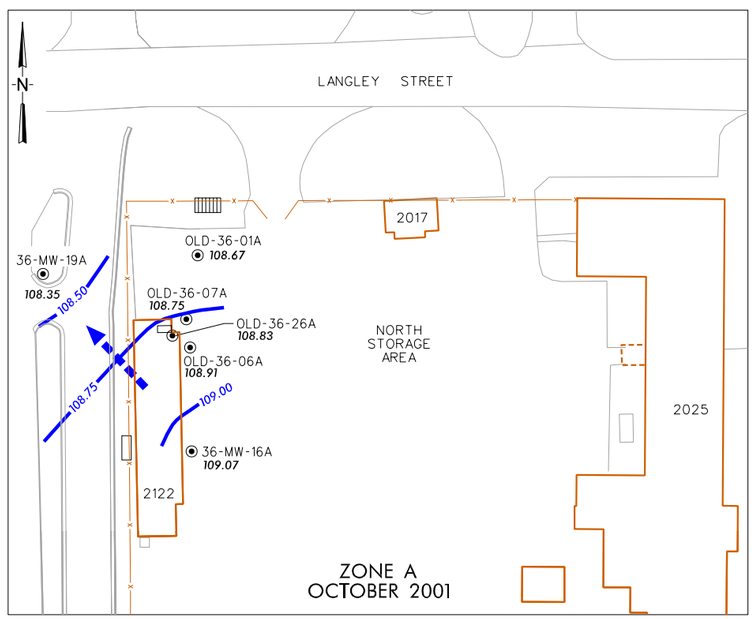
Water levels in monitoring wells were recorded on multiple occasions at SA 36 during the site investigation. The monitoring well locations and well top elevations were surveyed and the depth-to-water and well top elevation data were used to determine the elevation of the potentiometric head at each well. The potentiometric data that are provided in Table 2-1 were used to construct potentiometric surface contour maps using the July and October 2001 measurements that represent the latest available, complete rounds of data prior to abandonment of the site wells. The data and potentiometric surface contours for monitoring wells constructed at similar depths within the surficial aquifer (i.e., A, B, and C well sets) are shown in Figure 4-1.

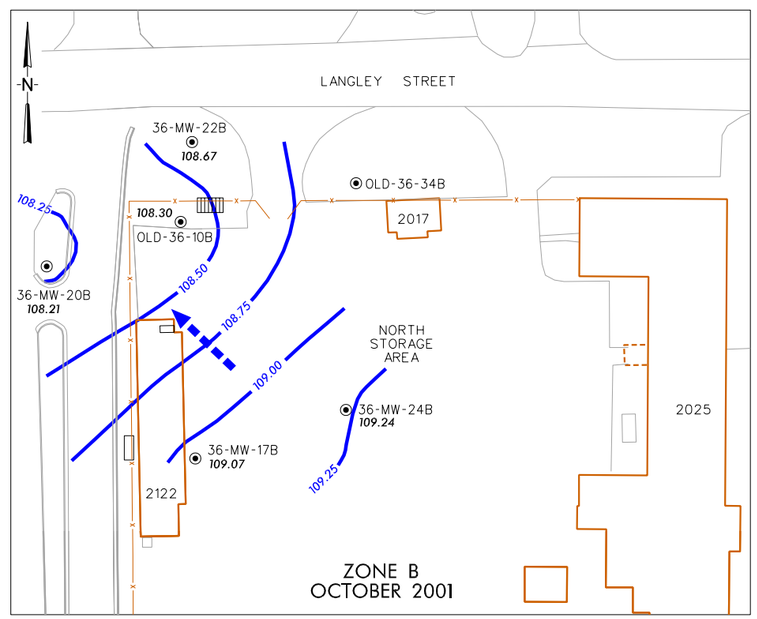
The average horizontal potentiometric gradients for each aquifer depth were calculated and are provided in Table 4-1. The horizontal gradients in the portion of the aquifer above the cemented sand interval fall within a narrow range of 0.006 to 0.009 ft/ft using data from the A and B wells, and they are consistent with the value reported for the water table in the previous Site Screening Report (HLA, 1999). A somewhat lower horizontal gradient range of 0.001 to 0.002 ft/ft was observed beneath the cemented sand interval, in the C wells. The potentiometric contours for A and B aquifer depths shown in Figure 4-1 are very similar and show that groundwater is flowing to the northwest above the cemented sand interval. However, the direction of groundwater flow beneath the cemented sand interval, in the C wells, is toward the southeast. The northwest flow direction in the shallow wells is interpreted to result from the effects of a groundwater divide located to the east of site SA 36. The divide is believed to result from either

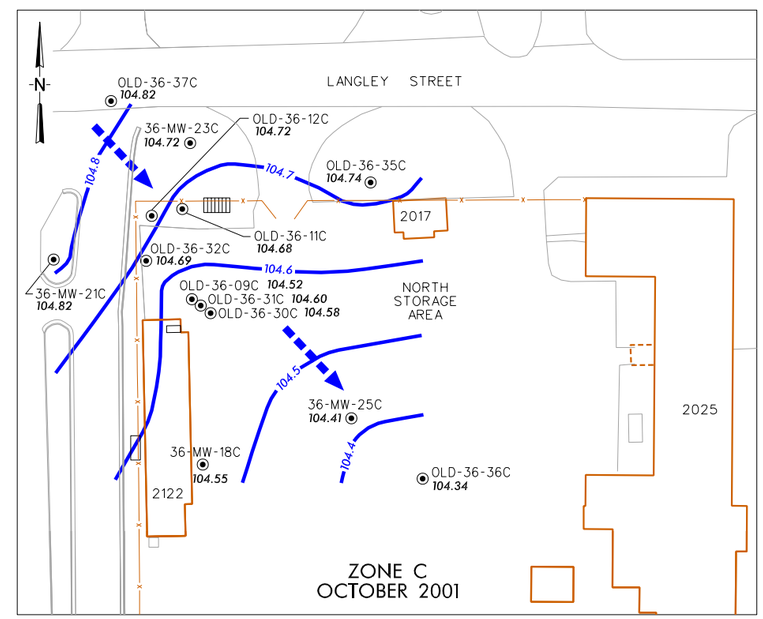












LEGEND

- MONITORING WELL
- 104.25 GROUNDWATER CONTOUR
- FLOW DIRECTION

80 0 80
SCALE IN FEET

FIGURE 4-1
GROUNDWATER ELEVATION CONTOURS
ZONES A, B, AND C
JULY AND OCTOBER 2001
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

n11x17h.dgn

CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-035.dgn 8-1-02 SITE INVESTIGATION REPORT

TABLE 4-1

AQUIFER HORIZONTAL GRADIENTS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Pair	Screen Interval (feet bgs)	Horizontal Distance (feet)	Groundwater Elevation* Jul-01	Groundwater Elevation* Oct-01	Horizontal Gradients (ft/ft) A Wells	Horizontal Gradients (ft/ft) B Wells	Horizontal Gradients (ft/ft) C Wells	Average Horizontal Gradient (ft/ft)
33A	8.0 to 18.0	180	108.5	--	0.008			0.007
19A	6.9 to 16.9		107.06					
16A	7.0 to 17.0	120	--	109.09	0.006			
19A	6.9 to 16.9			108.35				
24B	19.0 to 24.0	172	108.44	--		0.009		0.008
20B	19.1 to 24.1		106.89					
24B	19.0 to 24.0	132	--	109.24		0.007		
10B	20.0 to 25.0			108.3				
11C	30.0 to 35.0	200	103.19	--			0.001	0.002
36C	29.9 to 35.9		102.89					
12C	30.0 to 35.0	200	--	104.72			0.002	
36C	29.9 to 35.9			104.34				

* Feet above mean sea level.

variation in local recharge rates, by relief on the upper surface of the cemented sand interval, subgrade utilities acting like drains, or from well pumping (residential irrigation) west of the site. Whatever the cause, shallow groundwater flow above the cemented sand interval at SA 36 does not follow the expected eastward aquifer flow direction, toward Lake Susannah, as observed in the deeper C wells.

In November 2000, CCI conducted slug testing in 15 of the site monitoring wells to estimate the hydraulic conductivity of the surficial aquifer at SA 36 (CCI, 2001). Subsequently, CCI revised the slug test results for the A-depth wells downward (personal communication from J. Ottoson, CCI, February 28, 2002). Based on the slug test results, the average hydraulic conductivities for the different aquifer depth intervals are as follows: A wells = 6.3 ft/day; B wells = 6.0 ft/day; and C wells = 4.4 ft/day. These results indicate that horizontal hydraulic conductivities are similar throughout the surficial aquifer. These data were used to calculate average horizontal groundwater seepage velocities of 64, 88, and 11 feet per year, respectively, for the three depth intervals (calculations provided in Appendix E). The hydraulic and velocity calculations indicate that groundwater above the cemented sand interval is moving relatively fast with respect to groundwater beneath the layer. Similarly, the dissolved VOCs in groundwater were demonstrated by contaminant migration rate calculations to be moving faster above the cemented sand layer (see Appendix E).

Because some degree of vertical plume migration is indicated by the groundwater data, the presence of vertical potentiometric gradients within the surficial aquifer was investigated. The data from four well clusters situated across the site were used to calculate the vertical hydraulic gradients. The potentiometric head difference and the vertical distance between the midpoints of the well screens in the respective wells used for each vertical gradient determination were used in the calculation. These data are summarized in Table 4-2 and show that most vertical gradients are downward. The results suggest that vertical gradients between A and B well pairs are relatively minor in the vicinity of 19A and 33A, but significantly larger at 7A. The larger downward gradient at 7A is attributed to the fact that the well screen at 8B is 3 feet deeper than at 20B and 24B. Therefore, well 8B penetrates the cemented sand interval, and water levels in this well area are lower because of the steep downward gradient across the cemented sand interval (see Figure 2-1). The results for 16A, which show a very low upward gradient, are surmised to be a result of a small elevation survey, measurement, or data recording error, as there is no reason to believe that a localized upward gradient exists at that location. In summary, based on the data presented in Tables 4-1 and 4-2, groundwater flow above the cemented sand interval has similar horizontal and vertical hydraulic gradients. This observation suggests that lateral flow with a downward component is occurring in the shallow aquifer zone.

The results presented in Table 4-2 for the B and C well pairs are very different than discussed above for the A and B well pairs. All of the vertical gradients observed for B and C well pairs (i.e., across the cemented sand interval) were 4 to 10 times greater than the A and B well pairs, and were two orders of

TABLE 4-2

AQUIFER VERTICAL GRADIENTS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Cluster	Screen Interval (feet bgs)	Vertical Distance (feet)[a]	Groundwater Elevation* March 2001	Groundwater Elevation* July 2001	Groundwater Elevation* October 2001	Vertical Gradients[b] March 2001			Vertical Gradients[b] July 2001			Vertical Gradients[b] October 2001			Average Vertical Gradient[b]
						A to B	B to C	C to D	A to B	B to C	C to D	A to B	B to C	C to D	
7A	15.0 to 20.0	A-B = 7.5	103.97	107.65	108.75	0.097			0.127			0.099			0.108
8B[c]	22.5 to 27.5	B-C = 7.5	103.24	106.70	108.01		0.428			0.476			0.465		0.471
9C	30.0 to 35.0	C-D = 31	100.03	103.13	104.52			0.006			-0.001			0.093	0.046
13D	61.0 to 66.0		99.83	103.15	101.65										--
16A	7.0 to 17.0	A-B = 9.5	104.24	107.96	109.07	-0.011			-0.003			0.000			-0.002
17B	19.0 to 24.0	B-C = 10.5	104.34	107.99	109.07		0.430			0.467			0.430		0.449
18C	29.5 to 34.5		99.82	103.09	104.55										--
19A	6.9 to 16.9	A-B = 9.7	103.49	107.06	108.35	0.002			0.018			0.014			0.016
20B	19.1 to 24.1	B-C = 8.4	103.47	106.89	108.21		0.435			0.430			0.404		0.417
21C	28.0 to 32.0		99.82	103.28	104.82										--
33A	8.0 to 18.0	A-B = 8.5	104.38	108.50	--[c]	0.002			0.007			--			0.007
24B	19.0 to 24.0	B-C = 10.5	104.36	108.44	109.24		0.442			0.523			0.460		0.491
25C	29.5 to 34.5		99.72	102.95	104.41										--

[a] Distance between screen interval mid-points used; water levels in "A" wells were above or near screen top.
[b] Negative value indicates upward gradient.
[c] Groundwater elevation from well 28A used in place of anomolous data from 8A in Oct-01; anomolous groundwater elevation at 33A not used in calculations.
* Feet above mean sea level.

magnitude greater than the average horizontal gradients for any depth interval. And, as shown in Table 4-2, the vertical gradient between B and C wells varied within only a small range (0.404 to 0.523) regardless of the well pair location at SA 36. These results suggest that the cemented sand interval acts as a consistent aquitard to vertical flow within the geographic area defined by the well pairs. The vertical gradients between the only available C and D well pair (i.e., 9C and 13D) showed considerable variation from 0.093 downward to 0.001 upward. However, based on the hydrogeologic setting of this aquifer interval, more horizontal flow toward Lake Susannah is expected in this lower, sandy interval compared to the overlying shallow aquifer.

4.1.2 Groundwater Data (2002)

Final clearing and grading of SA 36 was performed in the fall and winter of 2001 in preparation for site re-development. These actions included the abandonment of all monitoring wells used during the site investigation and the IRA (01A through 37C). In April 2002, a set of replacement monitoring wells were installed to continue monitoring of the groundwater flow and geochemistry in tracking and evaluating progress of the IRA at the site. The set of replacement monitoring wells (identified with “R” in the well name) was designed to allow for upgradient, in-plume, cross-gradient, and down-gradient monitoring points in each of the three aquifer depth intervals, A, B, and C. The locations of the wells were selected based on the historical groundwater elevation data and flow directions (see Table 2-1 and Figure 4-1) with some adjustment made to allow placement of the wells along future residential property easements, where possible.

Water levels were measured in the replacement monitoring wells in April 2002 and twice during August 2002, and the data are summarized in Appendix D. The well tops were surveyed and the groundwater elevation for each well was determined with respect to mean sea level. Hydrographs that show the historical comparison between the site investigation wells and the replacement wells data sets for each aquifer depth zone (A, B, and C) are provided in Figures 4-2, 4-3, and 4-4, respectively. Potentiometric surface maps for each aquifer depth zone are also presented in Appendix D for the August 24, 2002, data set. Up to 1.3 feet of vegetable oil was noted at well 07AR in 2002.

The hydrographs show that the 2002 groundwater elevations in the replacement wells in the A, B, and C aquifer zones span the range of site investigation observations. In the A zone, the hydrograph suggests that anomalous data were recorded for several wells (02A, 27A, and 33A) during October 2001. The remaining data show an elevation change across the site ranging between 0.5 to 2 feet for A-zone wells on any measurement date. The data also show that the elevation of the water table varies up to about

FIGURE 4-2

HYDROGRAPH FOR ZONE A WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

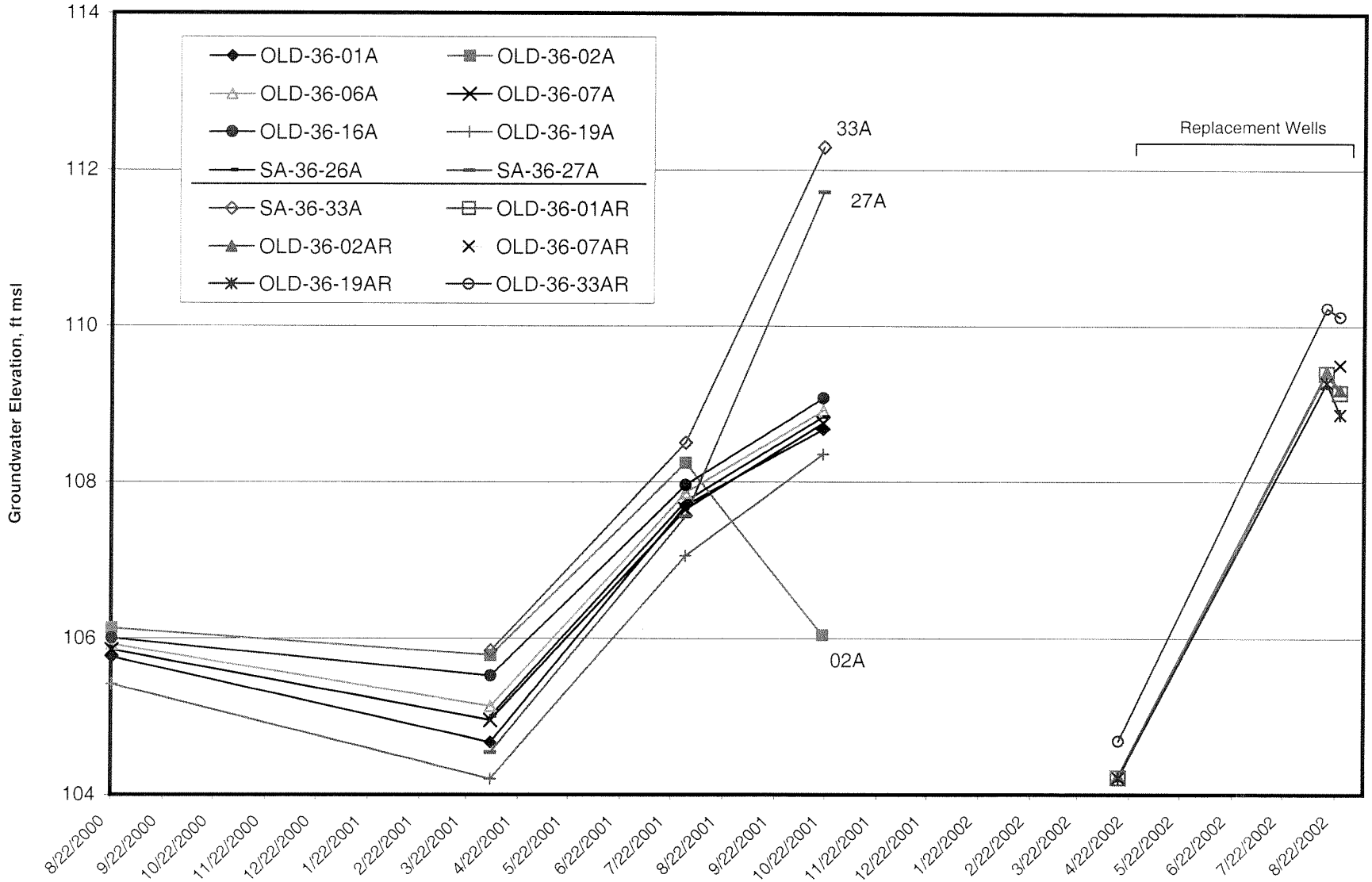


FIGURE 4-3

HYDROGRAPH FOR ZONE B WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

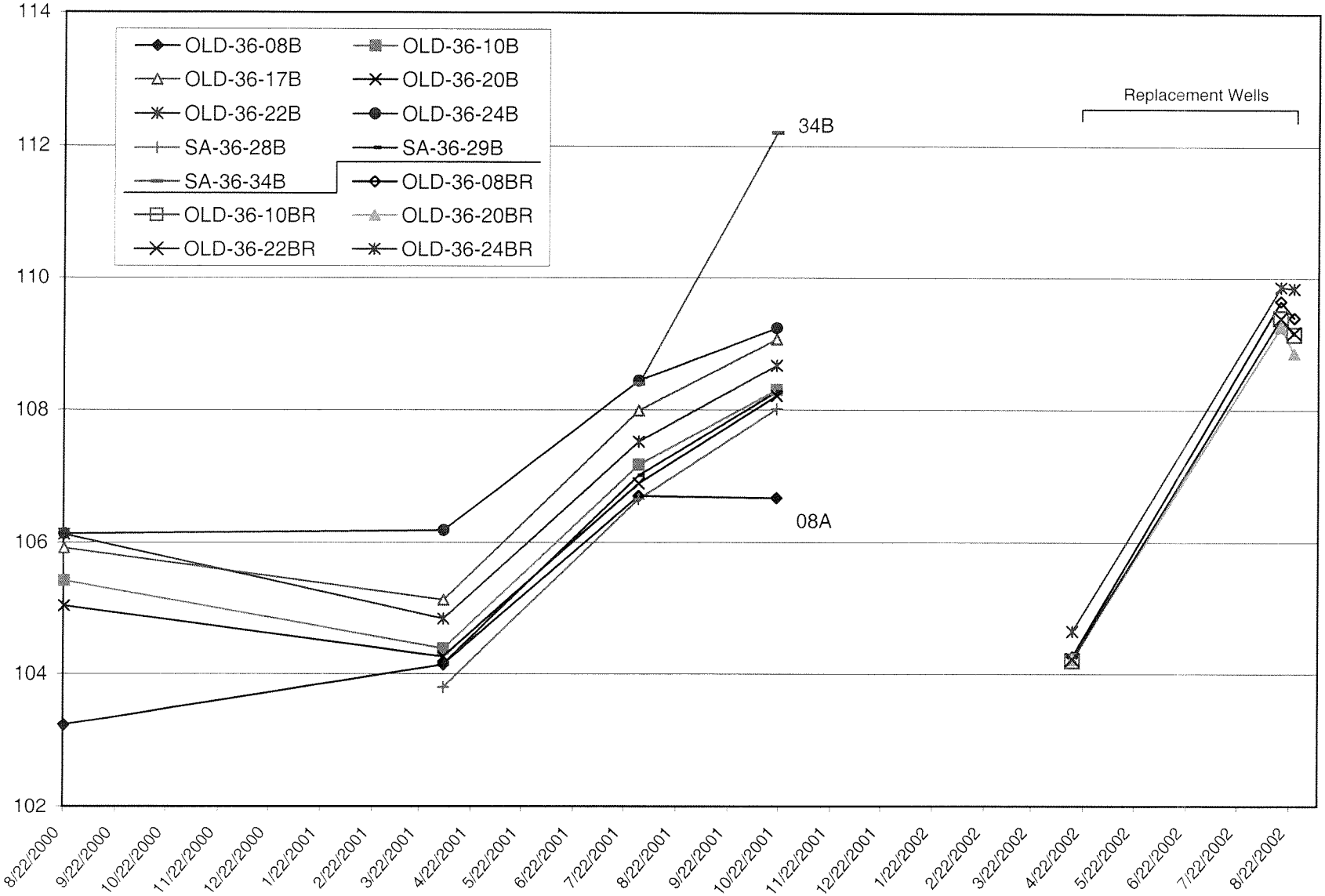
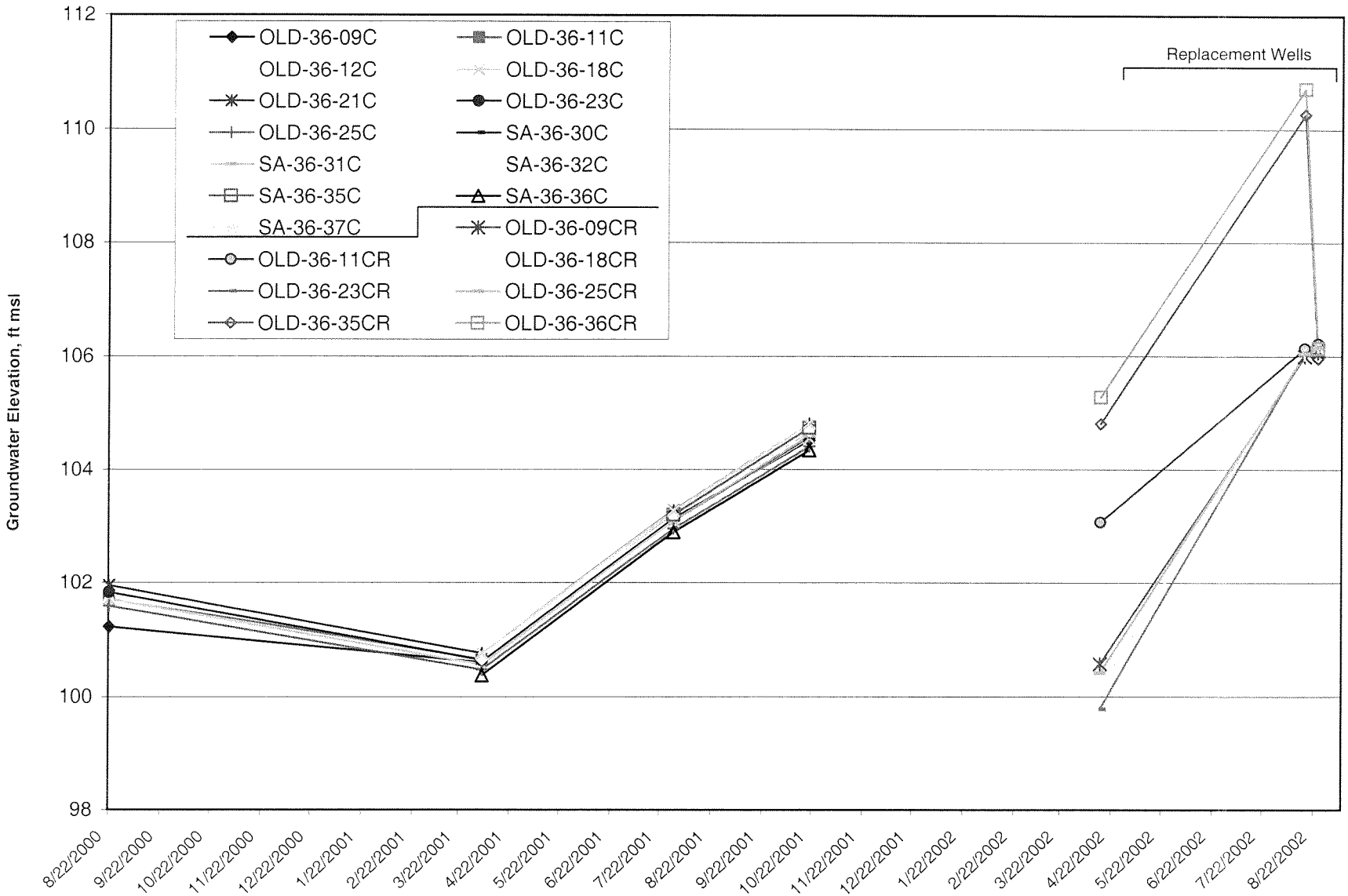


FIGURE 4-4

HYDROGRAPH FOR ZONE C WELLS
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA



4 feet seasonally (spring to fall). The groundwater potentiometric surface shown for August 24, 2002, is very similar to that shown in Figure 4-1 for the A wells, and the flow direction is to the northwest. A consistent pattern is observed between the site investigation and the replacement wells with the exception that the gradient across the site was somewhat less during 2002.

The hydrograph for the B-zone wells shows similar trends as described above for the A zone. The October 2001 data for wells 08B and 34B are anomalous. The range of elevation change across the site is typically around 2 feet on each measurement date, and the seasonal variation is again around 4 to 5 feet. This is expected because both A and B wells are shallow and are completed above the cemented sand interval. The groundwater potentiometric surface shown for August 24, 2002, is very similar to that shown in Figure 4-1 for the B wells, and the flow direction is to the northwest. Again, the patterns are consistent between the site investigation and replacement wells with the exception that the gradient across the site was somewhat less during 2002.

The hydrograph for the C zone wells shows a very consistent pattern during the site investigation prior to well replacement; less than 0.5 foot of elevation change was observed across the site on each date. This resulted in a very low gradient across the site in the deeper portion of the aquifer and groundwater flow to the southeast. The replacement well data show a significant increase in the elevation change across the site on April 15, 2002, and on August 16, 2002. High groundwater elevations in wells 35C and 36C along the eastern side of the site suggest a change in groundwater flow direction to the west. Elevations in these two wells on August 24, 2002, are shown to return to conditions similar to those prior to the well replacement. The cause for the changing conditions in the C zone replacement wells is not known. However, because of hydraulic connectivity between the deeper aquifer and nearby lakes (Shannon and Barton) the anomalously high groundwater levels in wells 35C and 36C may be related to short-term high surface water levels in Lake Shannon. A seasonal variation of 4 to 5 feet was observed in both 2001 and 2002 (similar to A and B wells). The groundwater potentiometric surface shown for August 24, 2002, is similar to that shown in Figure 4-1 for the C wells, but the flow direction was oriented more toward the east in 2002.

4.2 SOIL SAMPLING RESULTS

Table 4-3 shows the analytes detected during the soil sampling event, and the complete analytical data are included in Appendix C. The soil data were compared to the following screening criteria:

- For an organic analyte, the FDEP residential Soil Cleanup Target Level (SCTL).
- For an inorganic analyte, the residential SCTL or the site-specific BGSV, whichever is greater.

TABLE 4-3

ANALYTES DETECTED IN SURFACE SOILS IN CONFIRMATION SAMPLING
STUDY AREA 36 – MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sampling Location	Sampling Date	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Mercury (mg/kg)	TRPH (mg/kg)
Florida SCTL[1]		26	0.8	110	3.4	340
Surface BGSV[2]			1.0	8.7	0.1	
S010	04/16/00				0.018U	
S011	04/16/00				0.015U	
S012	04/16/00				0.014U	
S013	04/16/00				0.015U	
S014	04/16/00				0.007U	
S015	04/16/00			18.20		
S016	04/16/00			109.00		
S017	04/16/00					35J
S018	04/16/00					13J
S019	04/16/00					140J
S020	04/16/00					130J
S020D	04/16/00					180J
S021	04/16/00	0.17U	0.55			
S022	04/16/00	0.17U	0.26U			
S023	04/16/00	0.17U	0.26U			
S024	04/16/00	0.16U	0.26U			
S025	04/16/00	0.16U	0.39			
S026	04/16/00	0.17U	0.27			
S027	04/16/00	0.17U	0.26U			
S028	04/16/00	0.17U	0.81			
S029	04/16/00	0.17U	0.76			
S030	04/16/00	0.17U	O.26U			
S030D	04/17/00	0.16U	0.26U			
S031	04/17/00	0.17U	0.67			170J
S032	04/17/00	0.17U	0.31			
S033	04/17/00	0.17U	0.26U			
S034	04/17/00	0.17U	0.27U			
S035	04/17/00	0.16U	0.26U			
S036	04/17/00	0.22	0.46			
S037	04/17/00	0.21	0.25U			

[1] FDEP Residential Soil Cleanup Target Level
[2] Background screening value. The background screening value is twice the average of detected concentrations for inorganic analytes.
J The analyte was positively identified and the associated numerical value is an estimated concentration.
U The analyte was analyzed for but not detected above the reported sample quantitation limit. The number preceding the U qualifier is the reported sample quantitation limit.

The analyses of 28 surface soil samples collected in April 2000 (see Figure 3-4) revealed some elevated concentrations of inorganics, but no concentrations that exceeded screening criteria. The arsenic concentration at soil sample location S028 (0.81 mg/kg) slightly exceeded its SCTL of 0.8 mg/kg, but was below the BGSV of 1.0 mg/kg. Barium concentrations at sampling locations S015 (18.2 mg/kg) and S016 (109.0 mg/kg) exceeded the BGSV of 8.7 mg/kg, but were below the SCTL of 110 mg/kg. Antimony, mercury, and TRPH concentrations were below their respective SCTLs and antimony and mercury concentrations were below their respective BGSVs. The soil data showed that the soil at SA 36 poses no unacceptable, current or future risks to human health or the environment. The OPT determined that no actions for soil remediation or exposure control were necessary.

4.3 GROUNDWATER SAMPLING RESULTS

The analytes that were detected in groundwater during the site investigation are presented in Table 4-4, and complete validated analytical results are contained in Appendix C. The analytical data from the IRA are presented in Appendix D. Samples from wells 33A through 37C and 01AR and 10BR were collected by CCI for the site investigation during IRA activities and the analytical results are presented in both Appendices C and D. The groundwater data were compared to the following screening criteria:

- For an organic analyte, the FDEP GCTL.
- For an inorganic analyte, the GCTL or the site-specific BGSV, whichever is greater.

4.3.1 Site Investigation Data

Antimony

In April 2000, groundwater samples from wells 1A and 15A were analyzed for antimony to determine whether the historical exceedances were due to elevated turbidity in the original samples (see Figure 3-5 for well locations). The sample from well 15A in the South Storage Area did not contain a detectable concentration of antimony. The results of sampling well 15A removed the previous concern about antimony in groundwater under the South Storage Area (HLA, 1999). Groundwater under the South Storage Area meets the GCTLs and no further action is required.

Similarly, antimony was not detected in well 1A and is, therefore, not of concern in the North Storage Area. The failure to detect antimony in wells 1A and 15A strongly suggests that the elevated concentrations detected during the initial screening activities resulted from high turbidity in the samples.

TABLE 4-4

SUMMARY OF DETECTIONS IN GROUNDWATER
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 1 OF 7

Well Designation	CAS No.	Screening Criteria	OLD-36-01A	OLD-36-02A	OLD-36-06A	OLD-36-07A	OLD-36-08B
Sample			NTC36G01A10	NTC36G02A10	NTC36G06A10	NTC36G07A10	NTC36G08B10
Sample Date		Florida GCTL	4/17/00	4/16/00	4/16/00	4/16/00	4/16/00
Volatiles (µg/L)							
1,2-Dichloroethane	107-06-2	3					
1,3,5-Trimethylbenzene	108-67-8	10	NA	NA	NA	NA	NA
Acetone	67-64-1	700					
Benzene	71-43-2	1					
Carbon Disulfide	75-15-0	700					
Chloroform	67-66-3	5.7					
cis-1,2-Dichloroethene	156-59-2	70	2			0.3 J	
Ethylbenzene	100-41-4	30					
Methylene Chloride	75-09-2	5					
Tetrachloroethene	127-18-4	3	0.3 J		0.25 J		
Toluene	108-88-3	40					
trans-1,2-Dichloroethene	1330-20-7	100	0.16 J				
Trichloroethene	156-60-5	3	0.79 J		**14**	**34**	**46**
Xylenes, Total	79-01-6	20					

TABLE 4-4

SUMMARY OF DETECTIONS IN GROUNDWATER
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 2 OF 7

Well Designation	CAS No.	Screening Criteria	OLD-36-09C	OLD-36-10B	OLD-36-11C	OLD-36-12C
Sample			NTC36G0910	NTC36G10B10	NTC36G11C10	NTC36G12C10
Sample Date		Florida GCTL	4/16/00	4/17/00	4/17/00	4/17/00
Volatiles (µg/L)						
1,2-Dichloroethane	107-06-2	3				
1,3,5-Trimethylbenzene	108-67-8	10	NA	NA	NA	NA
Acetone	67-64-1	700	170 J		3.9 J	
Benzene	71-43-2	1		0.26 J	0.17 J	0.34 J
Carbon Disulfide	75-15-0	700	1.8 J			
Chloroform	67-66-3	5.7				
cis-1,2-Dichloroethene	156-59-2	70	47	8.9	6.6	3.2
Ethylbenzene	100-41-4	30				
Methylene Chloride	75-09-2	5				
Tetrachloroethene	127-18-4	3		1.5	2.3	
Toluene	108-88-3	40				
trans-1,2-Dichloroethene	1330-20-7	100	0.46 J	0.2 J	0.15 J	
Trichloroethene	156-60-5	3	**180**	**19**	**5.1**	**8.1**
Xylenes, Total	79-01-6	20				

TABLE 4-4

SUMMARY OF DETECTIONS IN GROUNDWATER
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS No.	Screening Criteria	OLD-36-13D		OLD-36-14D	OLD-36-15A	OLD-36-16A
Sample			NTC36G013D10	NTC36G013D10-D	NTC36G14D10	NTC36-G15A10	NTC36G16A11
Sample Date		Florida GCTL	4/16/00	4/16/00	4/16/00	4/18/00	8/24/00
Volatiles (µg/L)							
1,2-Dichloroethane	107-06-2	3				0.14 J	
1,3,5-Trimethylbenzene	108-67-8	10	NA	NA	NA	NA	NA
Acetone	67-64-1	700		3 J		2.6 J	
Benzene	71-43-2	1					
Carbon Disulfide	75-15-0	700					0.3 J
Chloroform	67-66-3	5.7			0.14 J		0.32 J
cis-1,2-Dichloroethene	156-59-2	70					
Ethylbenzene	100-41-4	30					
Methylene Chloride	75-09-2	5					
Tetrachloroethene	127-18-4	3					
Toluene	108-88-3	40					
trans-1,2-Dichloroethene	1330-20-7	100					
Trichloroethene	156-60-5	3					
Xylenes, Total	79-01-6	20					

TABLE 4-4

SUMMARY OF DETECTIONS IN GROUNDWATER
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 4 OF 7

Well Designation	CAS No.	Screening Criteria	OLD-36-17B	OLD-36-18C	OLD-36-19A	OLD-36-20B	OLD-36-21C
Sample			NTC36G17B11	NTC36G18C11	NTC36G19A11	NTC36G20B11	NTC36G21C11
Sample Date		Florida GCTL	8/24/00	8/24/00	8/24/00	8/24/00	8/24/00
Volatiles (µg/L)							
1,2-Dichloroethane	107-06-2	3					
1,3,5-Trimethylbenzene	108-67-8	10	NA	NA	NA	NA	NA
Acetone	67-64-1	700		12 J			
Benzene	71-43-2	1					
Carbon Disulfide	75-15-0	700	0.13 J			0.11 J	0.67 J
Chloroform	67-66-3	5.7	0.6 J	0.52 J		0.087 J	1.2
cis-1,2-Dichloroethene	156-59-2	70					
Ethylbenzene	100-41-4	30	0.058 J	0.19 J			
Methylene Chloride	75-09-2	5	0.19 J				0.16 J
Tetrachloroethene	127-18-4	3					
Toluene	108-88-3	40	0.15 J	0.28 J			0.11 J
trans-1,2-Dichloroethene	1330-20-7	100					
Trichloroethene	156-60-5	3				0.061 J	0.84 J
Xylenes, Total	79-01-6	20	0.37 J	1.1			

TABLE 4-4

SUMMARY OF DETECTIONS IN GROUNDWATER
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

PAGE 5 OF 7

Well Designation	CAS No.	Screening Criteria	OLD-36-22B	OLD-36-23C	OLD-36-24B	OLD-36-25C	
Sample			NTC36G22B11	NTC36G23C11	NTC36G24B11	NTC36G25C11	NTC36G25C11-D
Sample Date		Florida GCTL	8/24/00	8/24/00	8/24/00	8/24/00	8/24/00
Volatiles (µg/L)							
1,2-Dichloroethane	107-06-2	3					
1,3,5-Trimethylbenzene	108-67-8	10	NA	NA	NA	NA	NA
Acetone	67-64-1	700		14 J			
Benzene	71-43-2	1		0.29 J			
Carbon Disulfide	75-15-0	700			0.13 J	1.5	1.7
Chloroform	67-66-3	5.7		0.67 J	0.34 J	1.6	2
cis-1,2-Dichloroethene	156-59-2	70	1.9	0.74 J			
Ethylbenzene	100-41-4	30		0.086 J			
Methylene Chloride	75-09-2	5		0.39 J			
Tetrachloroethene	127-18-4	3		**13**			
Toluene	108-88-3	40		0.28 J			
trans-1,2-Dichloroethene	1330-20-7	100					
Trichloroethene	156-60-5	3	0.15 J	1.8		**7.7**	**6.9**
Xylenes, Total	79-01-6	20		1.5			

TABLE 4-4

SUMMARY OF DETECTIONS IN GROUNDWATER
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS No.	Screening Criteria	OLD-36-33A	OLD-36-34B	OLD-36-35C	OLD-36-36C
Sample			017-OLD-36-33A-Q1-01	017-OLD-36-34B-Q1-01	017-OLD-36-35C-Q1-01	017-OLD-36-36C-Q1-01
Sample Date		Florida GCTL	3/16/01	3/16/01	3/16/01	3/16/01
Volatiles (µg/L)						
1,2-Dichloroethane	107-06-2	3				
1,3,5-Trimethylbenzene	108-67-8	10				
Acetone	67-64-1	700	NA	NA	NA	NA
Benzene	71-43-2	1				
Carbon Disulfide	75-15-0	700	NA	NA	NA	NA
Chloroform	67-66-3	5.7				
cis-1,2-Dichloroethene	156-59-2	70				
Ethylbenzene	100-41-4	30				
Methylene Chloride	75-09-2	5	0.65 J	0.52 J	0.53 J	
Tetrachloroethene	127-18-4	3				
Toluene	108-88-3	40				
trans-1,2-Dichloroethene	1330-20-7	100				
Trichloroethene	156-60-5	3				
Xylenes, Total	79-01-6	20				

TABLE 4-4

SUMMARY OF DETECTIONS IN GROUNDWATER
STUDY AREA 36 - MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Designation	CAS No.	Screening Criteria	OLD-36-37C	OLD-36-01AR	OLD-36-10BR
Sample			017-OLD-36-37C-Q1-01	173601ARQ202	173610BRQ202
Sample Date		Florida GCTL	3/16/01	4/26/02	4/26/02
Volatiles (µg/L)					
1,2-Dichloroethane	107-06-2	3			
1,3,5-Trimethylbenzene	108-67-8	10	0.65 J		
Acetone	67-64-1	700	NA		
Benzene	71-43-2	1	**24**		
Carbon Disulfide	75-15-0	700	NA		
Chloroform	67-66-3	5.7			
cis-1,2-Dichloroethene	156-59-2	70		2.2	1.2
Ethylbenzene	100-41-4	30			
Methylene Chloride	75-09-2	5			
Tetrachloroethene	127-18-4	3			
Toluene	108-88-3	40			
trans-1,2-Dichloroethene	1330-20-7	100			
Trichloroethene	156-60-5	3		1.2	0.44 J
Xylenes, Total	79-01-6	20			

Notes:

GCTL = Groundwater Cleanup Target Level (Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999).

Empty cells indicate non-detects.

"J" qualifier indicates an estimated value.

Only chemicals detected in at least one sample are shown.

Values in shaded cells are equal to or exceed the screening criterion.

Chlorinated VOCs

The April 2000 results indicated that the extent of the groundwater VOC contamination was defined to the east and northeast in Zone A, but not defined in the other directions. The limits of VOC contamination were also not defined in the B and C Zones. Therefore, TtNUS installed and sampled ten additional wells in the North Storage Area in August 2000 (16A through 25C) to define the limits of the VOC contaminant plume. The wells were screened at various depths to 50 feet bgs.

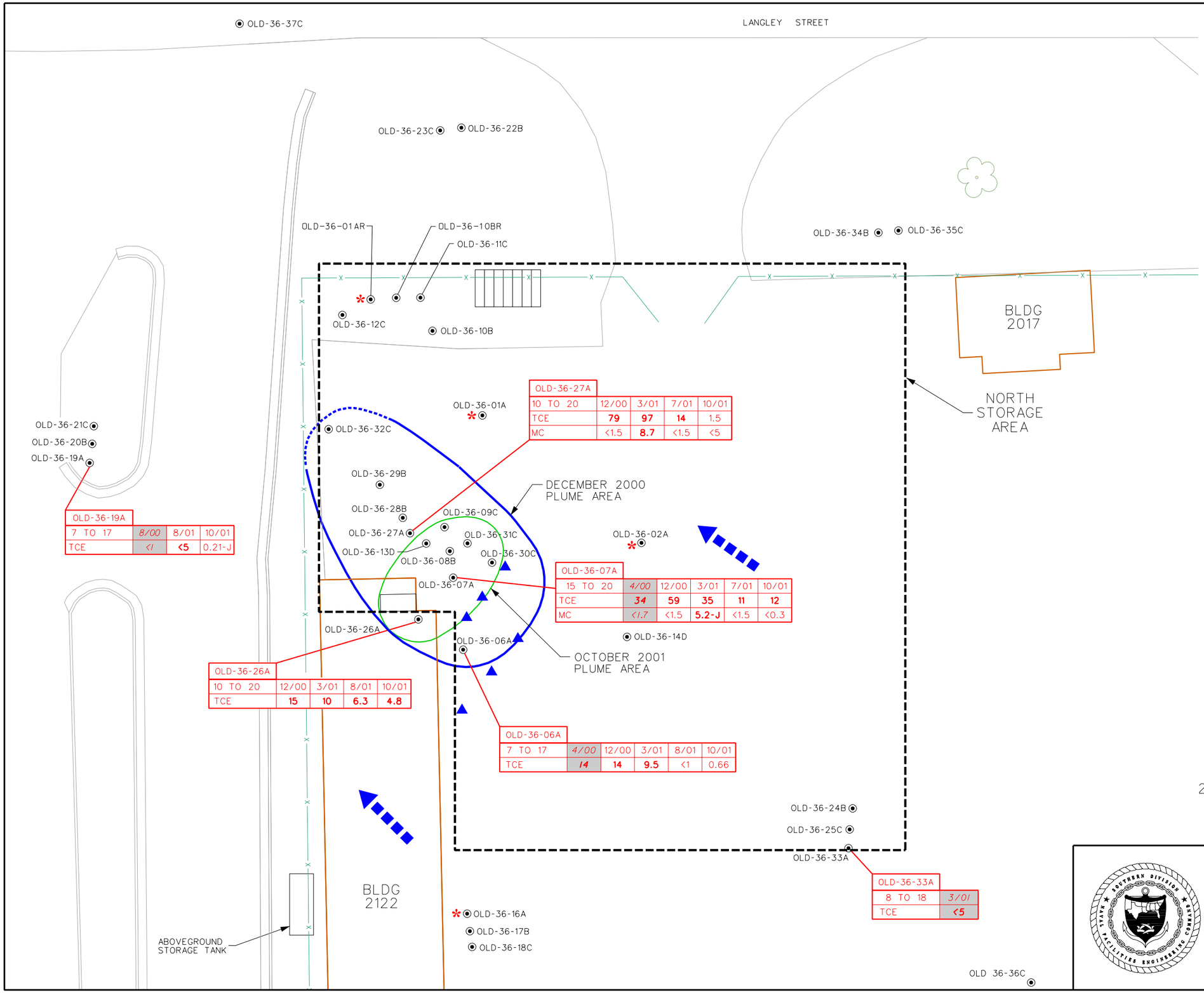
Figures 4-5, 4-6, and 4-7 show the exceedances observed in Zones A, B, and C, respectively. The combined results of the April 2000 and August 2000 sampling data provided sufficient information to define the limits of the VOC plume in Zone A in both crossgradient directions (northeast and southwest), but not in the downgradient directions (i.e., see December 2000 plume area). In Zone B, the VOC plume was defined in the upgradient and in both crossgradient directions, but not in the downgradient direction. The plume limits in Zone C were defined to the west and southwest, but the remainder of the plume was undefined.

The April 2000 and August 2000 groundwater sampling events may be summarized as follows:

- Portions of the TCE plume remained undefined.
- The presence of PCE, TCE, and *cis*-1,2-DCE in Zones A, B, and C suggested that anaerobic dehalogenation was occurring.
- No screening level exceedances were observed in Zone D.

In November 2000, CCI installed wells 33A through 37C around the perimeter of the TCE plume to define its boundaries and monitor any plume movement. Samples that CCI collected from wells 33A through 37C in March and October 2001 provided the data needed to define the plume in Zone C (see Figure 4-7). CCI also installed several plume interior wells (26A through 32C) to monitor the effects of the IRA. These wells were sampled quarterly beginning in December 2000. Although the data received only limited validation, the IRA monitoring results indicated that the limits of the TCE plume were defined by the October 2001 sample results in Zone A (see Figure 4-5). The IRA monitoring results showed that TCE concentrations were decreasing in the downgradient portion of the plume in the B Zone (well 10B, see Figure 4-6) but the downgradient limit was still not defined.

In April 2002, Nodarse installed two replacement monitoring wells (01AR and 10BR) to assist the investigation of the downgradient extent of the TCE plume in Zones A and B. Samples from these wells were analyzed for VOCs in April 2002. No observed concentrations exceeded screening criteria, allowing



OLD-36-27A				
10 TO 20	12/00	3/01	7/01	10/01
TCE	**79**	**97**	**14**	1.5
MC	<1.5	**8.7**	<1.5	<5

OLD-36-19A			
7 TO 17	*8/00*	8/01	10/01
TCE	*<1*	**<5**	0.21-J

OLD-36-07A					
15 TO 20	*4/00*	12/00	3/01	7/01	10/01
TCE	***34***	**59**	**35**	**11**	**12**
MC	*<1.7*	<1.5	**5.2-J**	<1.5	<0.3

OLD-36-26A				
10 TO 20	12/00	3/01	8/01	10/01
TCE	**15**	**10**	**6.3**	**4.8**

OLD-36-06A					
7 TO 17	*4/00*	12/00	3/01	8/01	10/01
TCE	***14***	**14**	**9.5**	<1	0.66

OLD-36-33A	
8 TO 18	*3/01*
TCE	***<5***

LEGEND

GROUNDWATER FLOW DIRECTION

MONITORING WELL

INJECTION POINT

OLD-36-01A		
20 TO 25	*8/00*	10/01
TCE	***7.2***	**8.9**

WELL I.D. — SAMPLE COLLECTION DATE — ANALYTE — ANALYTE CONCENTRATION [1,2,3] — SCREENED INTERVAL TO NEAREST FOOT

ESTIMATED VALUE	J
METHYLENE CHLORIDE (SEE NOTE)	MC
TRICHLOROETHENE (SEE NOTE)	TCE
VOLATILE ORGANIC COMPOUND	VOC
SAMPLED ONE OR MORE TIMES NO EXCEEDANCES DETECTED	*

1-CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
2-BOLD CONCENTRATION INDICATES EXCEEDANCE
3-SHADING AND ITALICS INDICATE DATA RECEIVED FULL VALIDATION. UNSHADED DATA RECEIVED LIMITED VALIDATION.

NOTE:

GROUNDWATER CLEANUP TARGET LEVEL FOR MC IS 5 µg/L.

GROUNDWATER CLEANUP TARGET LEVEL FOR TCE IS 3 µg/L.

ALL SITE STRUCTURES HAVE BEEN REMOVED AND ALL WELLS HAVE BEEN ABANDONED.

-N-

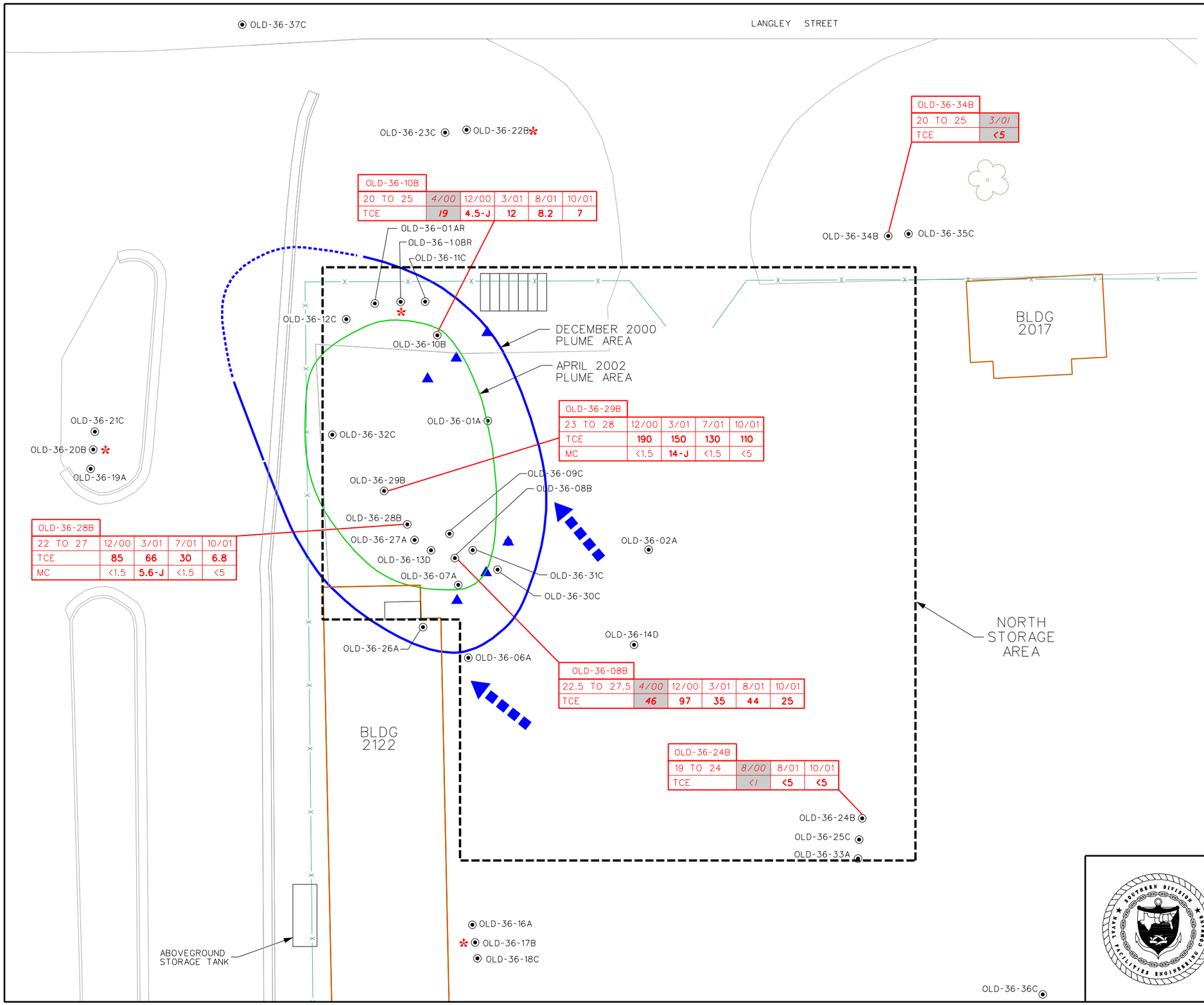
20 0 20
SCALE IN FEET

FIGURE 4-5
VOC EXCEEDANCES AND
PLUME AREA IN ZONE A
APRIL 2000 TO OCTOBER 2001
STUDY AREA 36 - NORTH STORAGE YARD

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

n11x17h.dgn

CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-048.dgn 9-11-02 Site Investigation Report



LEGEND

GROUNDWATER FLOW DIRECTION

MONITORING WELL

INJECTION POINT

WELL I.D. — SAMPLE COLLECTION DATE

OLD-36-10B		
20 TO 25	8/00	10/01
TCE	7.2	8.9

ANALYTE — ANALYTE CONCENTRATION[1,2,3] — SCREENED INTERVAL TO NEAREST FOOT

ESTIMATED VALUE	J
METHYLENE CHLORIDE (SEE NOTE)	MC
TETRACHLOROETHENE (SEE NOTE)	PCE
TRICHLOROETHENE (SEE NOTE)	TCE
VOLATILE ORGANIC COMPOUND	VOC
SAMPLED ONE OR MORE TIMES NO EXCEEDANCES DETECTED	*

1-CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
2-BOLD CONCENTRATION INDICATES EXCEEDANCE
3-SHADING AND ITALICS INDICATE DATA RECEIVED FULL VALIDATION. UNSHADED DATA RECEIVED LIMITED VALIDATION.

NOTE:

GROUNDWATER CLEANUP TARGET LEVEL FOR MC IS 5 µg/L.

GROUNDWATER CLEANUP TARGET LEVEL FOR TCE/PCE IS 3 µg/L.

ALL SITE STRUCTURES HAVE BEEN REMOVED AND ALL WELLS HAVE BEEN ABANDONED.

-N-

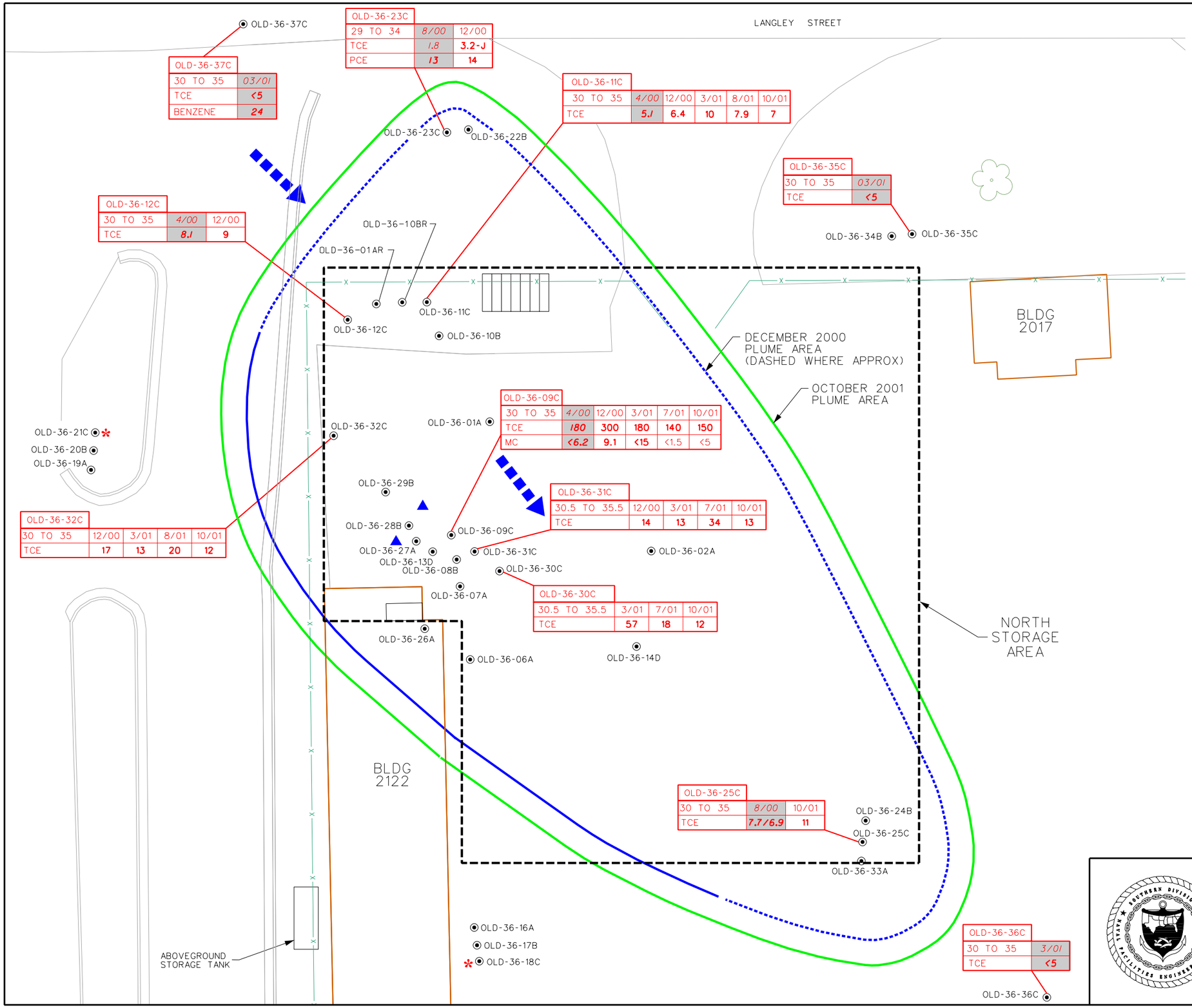
20 0 20
SCALE IN FEET

FIGURE 4-6
VOC EXCEEDANCES AND PLUME AREA IN ZONE B
APRIL 2000 TO OCTOBER 2001
STUDY AREA 36 - NORTH STORAGE YARD

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

n11x17h.dgn

CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-050.dgn 9-11-02 Site Investigation Report



OLD-36-23C		
29 TO 34	8/00	12/00
TCE	1.8	3.2-J
PCE	13	14

OLD-36-37C	
30 TO 35	03/01
TCE	<5
BENZENE	24

OLD-36-11C					
30 TO 35	4/00	12/00	3/01	8/01	10/01
TCE	5.1	6.4	10	7.9	7

OLD-36-35C	
30 TO 35	03/01
TCE	<5

OLD-36-12C		
30 TO 35	4/00	12/00
TCE	8.1	9

OLD-36-09C					
30 TO 35	4/00	12/00	3/01	7/01	10/01
TCE	180	300	180	140	150
MC	<6.2	9.1	<15	<1.5	<5

OLD-36-31C				
30.5 TO 35.5	12/00	3/01	7/01	10/01
TCE	14	13	34	13

OLD-36-32C				
30 TO 35	12/00	3/01	8/01	10/01
TCE	17	13	20	12

OLD-36-30C		
30.5 TO 35.5	3/01	7/01	10/01
TCE	57	18	12

OLD-36-25C		
30 TO 35	8/00	10/01
TCE	7.7/6.9	11

OLD-36-36C	
30 TO 35	3/01
TCE	<5

LEGEND

GROUNDWATER FLOW DIRECTION

MONITORING WELL

INJECTION POINT

WELL I.D.		SAMPLE COLLECTION DATE
OLD-36-10C		
20 TO 25	8/00	10/01
TCE	7.7/6.9	8.9

ANALYTE — TCE
SCREENED INTERVAL TO NEAREST FOOT — 20 TO 25
DUPLICATE SAMPLE — 7.7/6.9
ANALYTE CONCENTRATION[1,2,3] — 7.7, 6.9, 8.9

ESTIMATED VALUE	J
METHYLENE CHLORIDE (SEE NOTE)	MC
TETRACHLOROETHENE (SEE NOTE)	PCE
TRICHLOROETHENE (SEE NOTE)	TCE
VOLATILE ORGANIC COMPOUND	VOC
SAMPLED ONE OR MORE TIMES NO EXCEEDANCES DETECTED	*

1-CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
2-BOLD CONCENTRATION INDICATES EXCEEDANCE
3-SHADING AND ITALICS INDICATE DATA RECEIVED FULL VALIDATION. UNSHADED DATA RECEIVED LIMITED VALIDATION.

NOTES:

GROUNDWATER CLEANUP TARGET LEVEL FOR BENZENE IS 1 µg/L.

GROUNDWATER CLEANUP TARGET LEVEL FOR MCE IS 5 µg/L.

GROUNDWATER CLEANUP TARGET LEVEL FOR PCE/TCE IS 3 µg/L..

ALL SITE STRUCTURES HAVE BEEN REMOVED AND ALL WELLS HAVE BEEN ABANDONED.

FIGURE 4-7
VOC EXCEEDANCES AND
PLUME AREA IN ZONE C
APRIL 2000 TO OCTOBER 2001
STUDY AREA 36 - NORTH STORAGE YARD

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

n11x17h.dgn
CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-049.dgn 9-11-02 Site Investigation Report

definition of the downgradient extent of the plume in Zone B (Figure 4-7) and confirmation that the plume limits were defined in Zone A (Figure 4-5).

Benzene was detected above its GCTL of 1 µg/L in one Zone C well (24 µg/L in well 37C) during the March 2001 sampling round. Historically, benzene has not been detected above the GCTL in any other well at the site. Furthermore, well 37C is located in an upgradient position with respect to flow in the deep portion of the aquifer and neither PCE, TCE, nor their degradation products were detected in the well. Thus, the benzene detection is considered to be unrelated to activities conducted at SA 36.

4.3.2 IRA Monitoring Data

All replacement wells were sampled in May 2002 and analyzed for VOCs as part of the ongoing IRA monitoring. A sample was not collected from 07AR due to the presence of free-phase vegetable oil in the well. The data received a limited validation as part of the IRA program being conducted by CCI at the site. Appendix D includes a table summarizing the analytical results and maps showing the most current TCE plume limits; the distribution of VOCs in each aquifer zone; the location of the replacement wells; and the location of the former site investigation wells and site features.

The 2002 groundwater monitoring data from the replacement wells show that there were no exceedances of the GCTLs for any VOCs in the A Zone wells. A sample was not collected from well 07AR in the area determined to be the core of the plume during the site investigation. Regardless, the data indicate that the TCE plume in the A Zone is of limited lateral extent and that degradation of the plume by the enhanced bioattenuation used during the IRA may be nearly complete.

The TCE concentrations observed in the B Zone wells (Appendix D) indicate a central plume area that is interpreted to be similar to the April 2002 plume shown in Figure 4-6. The concentration of TCE at downgradient well 10BR remains below the GCTL of 3 µg/L. However, 3.5 µg/L of TCE and 3.66 µg/L of PCE were detected at well 22BR although adjacent, former well 22B did not show exceedances of any VOCs. Nearby former well 23C did show low concentrations of TCE and PCE that exceeded the GCTLs in this area during the site investigation. Collectively, these data suggest that some low concentration, residual groundwater contamination exists in this portion of the site that may be separated from the central plume area around well 08BR.

The TCE concentrations observed in the C Zone wells (Appendix D) indicate that the lateral extent of the plume has decreased since October 2001 (compare with Figure 4-7). The current up- and down-gradient

TCE plume limits are defined by wells 11CR and 25CR that lie within the former plume area. Furthermore, the TCE concentration in the central portion of the plume at well 09CR is less than one-fourth of the concentration observed during October 2001 at well 09C (25.3 vs 150 µg/L).

Low concentrations of several other VOCs were detected in the C Zone wells and exceedances of the GCTLs are shown on the maps in Appendix D. As noted for well 37C during the site investigation (Section 4.3.1), the presence of benzene and MTBE at upgradient well 23CR located in the same vicinity is attributed to a source hydraulically upgradient to SA 36. Chloroform and bromodichloromethane have not previously been identified as Contaminants of Concern (COCs) at SA 36 and neither of these VOCs can be attributed to the degradation of the known COCs at the site. Their presence at well 18CR, away from the known area of impact at SA 36, suggests that they are not related to former site activities. These two VOCs are known to occur in treated potable water sources. 1,2-dibromo-3-chloropropane and 1,1,2,2-tetrachloroethane (TCA) are also not attributed to degradation of the known COCs at the site, but their potential use during former site activities (in pesticide, herbicide, paint, degreaser) and their location within the historical and/or current plume area suggest that they are site-related COCs that should be monitored in the future.

5.0 GROUNDWATER INTERIM REMEDIAL ACTION

The OPT initiated the groundwater IRA in November 2000 to address chlorinated solvent contamination at SA 36. CCI is conducting the IRA, which includes the following tasks:

- Vegetable oil injection into the groundwater to enhance microbial growth and subsequent destruction of the solvents.
- Quarterly sampling and analysis of monitoring wells to assess progress in achieving the Florida GCTLs.
- Reporting results of remedial actions and groundwater monitoring to the OPT.

5.1 PROCESS DESCRIPTION

Chlorinated solvents may undergo biodegradation through three different pathways: as an electron acceptor, as an electron donor, or co-metabolism. Under anaerobic conditions, biodegradation of chlorinated solvents usually proceeds through a process called reductive dehalogenation. These compounds are electron acceptors and there must be an appropriate source of carbon for microbial growth and reductive dehalogenation to occur. In general, reductive dehalogenation occurs by sequential dechlorination. For the chlorinated ethenes, dechlorination proceeds from PCE to TCE to DCE to vinyl chloride and ethene. PCE and TCE are the most susceptible of these compounds to reductive dehalogenation because they are the most oxidized. Because these compounds are used as electron acceptors, there must be a appropriate source of carbon for microbial growth and reductive dehalogenation to occur.

The most common approach that is used to stimulate reductive dehalogenation has been the addition of a carbon source dissolved in groundwater. Food-grade vegetable oil is a potential carbon source for microbial growth and the reductive dehalogenation process. The separate phase nature of vegetable oil allows for slow dissolution into groundwater, making it a slow release carbon source. Vegetable oil is an inexpensive, innocuous carbon source that is not regulated as a contaminant by the USEPA.

5.2 FIELD ACTIVITIES

5.2.1 IRA Installation

CCI installed 15 vegetable oil injection points and 7 IRA monitoring wells in November 2000 using hollow stem auger drilling methods. New wells and injection points were placed wells near wells 6A, 7A, 8B, 9C,

and 10B, where the greatest TCE concentrations had been observed. For the source area near wells 6A and 7A, six injection points were installed in Zone A approximately 5–7 feet upgradient or southeast of wells 6A and 7A. There were two rows of three injection points, and the injection points were approximately 8–10 feet apart. The two new monitoring wells for this area (26A and 27A) were installed downgradient from wells 6A and 7A. Figure 4-5 shows the Zone A injection and monitoring well locations.

Three Zone B injection points were located approximately 5–7 feet upgradient or southeast of well 8B. The injection points were spaced approximately 8–10 feet apart. The two new monitoring wells for this area (28B and 29B) were installed downgradient of well 8B. For the source area near well 10B, three injection points were installed in a row approximately 5–7 feet upgradient of well 10B. Figure 4-6 shows the Zone B injection and monitoring well locations.

Three Zone C injection points were located approximately 5–7 feet upgradient or northwest of well 9C. The injection points were spaced approximately 8–10 feet apart. The three new monitoring wells for this area (30C, 31C, and 32C) were installed upgradient and downgradient of well 9C. Figure 4-7 shows the Zone C injection and monitoring well locations.

5.2.2 Vegetable Oil Injections

A total of 360 gallons of vegetable oil were injected into aquifer zone A, 360 gallons were injected in aquifer zone B, and 180 gallons were injected into aquifer Zone C in January 2001. The OPT evaluated the results of the baseline groundwater sampling and subsequent sampling events and agreed that additional vegetable oil should be injected at SA 36 because the sulfate present in the groundwater had consumed much of the carbon from the first injection (CCI, 2002). The injections were concentrated in Zone B and Zone C aquifer areas in the vicinity of wells 10B, 29B, 11C, and 31C. A total of approximately 540 gallons of vegetable oil were injected in November 2001. Vegetable oil was not injected in aquifer Zone A. Zones B and C were selected for additional injections because they had shown the least amount of TCE reduction.

5.3 IRA RESULTS

5.3.1 Organic Parameters

The changes in the concentrations of TCE and its daughter product, *cis*-1,2-DCE provide evidence of the success of the enhanced biodegradation IRA.

- The concentrations of TCE in the four Zone A wells that have historically contained exceedances of the GCTLs have decreased since the initial oil injection. Figure 4-5 shows a decrease in the overall concentration and size of the TCE plume between December 2000 (prior to the oil injection) and October 2001 (9 months after oil injection).

- The concentrations of *cis*-1,2-DCE, a degradation product of TCE, increased at wells 7A and 27A. These wells are located along a streamline that contained the highest concentration of TCE among the Zone A wells. The *cis*-1,2-DCE concentrations in wells were lower at wells 6A and 26A, which are located along a more upgradient streamline with lower initial TCE concentrations.

- The concentrations of TCE in three of the four Zone B wells that historically contained exceedances of the GCTLs have decreased significantly since the initial oil injection. Figure 4-6 shows a decrease in the overall concentration and size of the TCE plume between December 2000 (prior to the oil injection) and October 2001.

- The concentrations of *cis*-1,2-DCE increased at all Zone B wells located downgradient of the injection wells, except well 29B.

- The TCE concentrations in two of the three downgradient Zone C wells have decreased since the initial oil injection. Figure 4-7 shows that concentration in the central portion of the plume have decreased between December 2000 (prior to the oil injection) and October 2001.

5.3.2 Natural Attenuation Parameters

The following field and laboratory measurements indicate that the IRA is working as designed:

- TOC increased in the plume area, sharply in parts of the treatment zone. This indicates that the oil injection is having the desired effect of providing an increased carbon source for microbes.

- Dissolved oxygen remains low, below 0.5 mg/L in parts of the plume, indicating anaerobic conditions.

- Nitrate is low across the plume area, and sulfate is being depleted in the treatment zone. This suggests the generation of more reducing conditions that are favorable to higher rates of reductive dechlorination.

- Alkalinity and hydrogen increased in the treatment zone, indicating that microbial activity has increased.

5.4 OPERATING PROPERLY AND SUCCESSFULLY

The USEPA defines the phrase, “operating properly and successfully,” as follows (USEPA, 1996):

- A remedial action is operating properly if it is operating as designed.
- A remedial action is operating successfully when its operation indicates that it can achieve cleanup levels or other performance goals (GCTLs) in a reasonable period of time and the operation is protective of human health and the environment.

TtNUS prepared a draft Operating Properly and Successfully Evaluation Report for the OPT that documents the positive results of the IRA described in Section 5.3 (TtNUS, 2002). It was concluded in the report that the remedial actions (vegetable oil injection and groundwater monitoring) are “operating properly and successfully” and that progress is being made toward meeting the cleanup objectives.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 SOIL CONTAMINATION

The site screening identified exceedances of Florida SCTLs, but the subsequent sampling in the site investigation indicated that no exceedances were present. As a result, the OPT decided that no further investigation of soil was required. The soil at SA 36 is considered suitable for transfer under a residential reuse scenario.

6.2 GROUNDWATER CONTAMINATION

The extent of groundwater contamination has been determined during the site investigation, and the IRA for cleaning up the groundwater is "Operating Properly and Successfully." Figure 6-1 shows the areal extent of contamination, which was prepared by overlaying Figures 4-5, 4-6, and 4-7. The site map shows the proposed property and street layout provided by the developer. The figure shows a 50-foot buffer and the groundwater use restriction area requested by the developer. The groundwater use restriction boundary intrudes upon the buffer zone by approximately 15 feet in the southeastern portion of the buffer, but is considered adequately protective of human health. All groundwater south and east of the North Storage Area meets the Florida GCTLs.

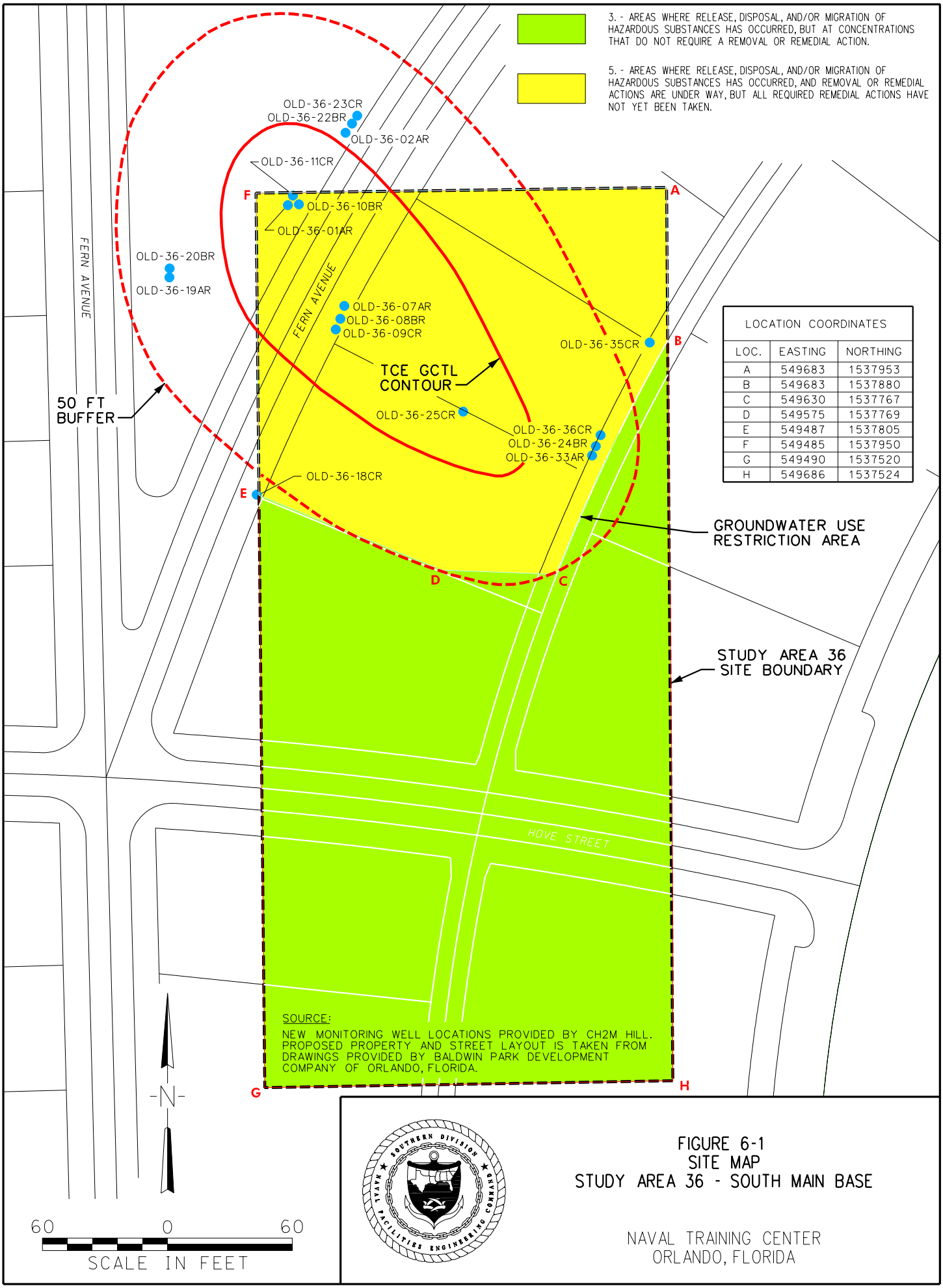
The following recommendations are made regarding remediation of groundwater at SA 36:

- Continue the IRA of enhancing biodegradation of the PCE/TCE plume with vegetable oil injections performed as required to continue reduction of contaminant concentrations.
- Continue monitoring for VOCs and natural attenuation parameters until contaminant concentrations decrease below the Florida GCTLs.

The groundwater contamination at SA 36 is limited to the plume area shown in Figure 6-1. South of the groundwater restriction boundary the groundwater quality meets the criteria for property transfer without groundwater use restrictions.

6.3 PROPERTY CLASSIFICATION CODE

In accordance with U. S. Department of Defense policy, it is recommended that the portion of SA 36 without groundwater contamination be reclassified as 3/LIGHT GREEN (areas where storage, release,



LOCATION COORDINATES

LOC.	EASTING	NORTHING
A	549683	1537953
B	549683	1537880
C	549630	1537767
D	549575	1537769
E	549487	1537805
F	549485	1537950
G	549490	1537520
H	549686	1537524

FIGURE 6-1
SITE MAP
STUDY AREA 36 - SOUTH MAIN BASE

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

n8_5x11v.dgn
CAD FILE NO./DATE: k:\dgn\navy\orlando\sites\sa36\sa36-046.dgn 8-8-02 Site Investigation Report

and/or migration of hazardous substances has occurred but at concentrations that do not require a removal or remedial action).

The portion of SA 36 associated with contaminated groundwater should remain as 5/YELLOW (areas where release, disposal, and/or migration of hazardous substances has occurred, and removal and/or remedial actions are underway, but all required remedial actions have not yet been taken) until the USEPA approves the OPS determination. In accordance with the 1992 Community Environmental Response Facilitation Act (CERFA) amendments to Section 120(h)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), all necessary remedial actions have been taken "if construction and installation of an approved remedial design has been completed and the remedy has been demonstrated to the [USEPA] Administrator to be operating properly and successfully." Upon receipt of the USEPA OPS determination, the groundwater contamination area should be reclassified as 4/DARK GREEN (areas where release, disposal, and/or migration of hazardous substances has occurred, and all remedial actions necessary to protect human health and the environment have been taken).

6.4 OPT CONCURRENCE

The undersigned members of the OPT concur with the findings and recommendations of the preceding investigation.

STUDY AREA 36

Gregory Fraley Senior Remedial Project Manager U.S. Environmental Protection Agency, Region 4	Date
David P. Grabka, P.G. Remedial Project Manager Florida Department of Environmental Protection	Date
Barbara Nwokike BRAC Environmental Coordinator U.S. Department of the Navy	Date

REFERENCES

ABB-ES (ABB Environmental Services, Inc.), 1994. *Base Realignment and Closure (BRAC) Environmental Baseline Survey Report,* Naval Training Center, Orlando, Florida. December.

ABB-ES, 1995a. *Site Screening Plan, Groups I Through V Study Areas and Miscellaneous Additional Sites,* Naval Training Center, Orlando, Florida. September.

ABB-ES, 1995b. *Background Sampling Report, Naval Training Center, Orlando, Florida*. Unit Identification Code N65928, Contract Number N62467-89-D-0317. August.

ABB-ES, 1997. *Project Operations Plan for Site Investigations and Remedial Investigations*, Naval Training Center, Orlando, Florida, Unit Identification Code N65928, Navy CLEAN District 1, Contract No. N62467-89-D-0317. August.

B&RE (B&R Environmental), 1997. *Health and Safety Plan for Completion of Investigative Work and Data Sampling*, Naval Training Center, Orlando, Florida, Contract No. N62467-94D-0888 (Addenda, Tetra Tech NUS, Inc., 1998 and 1999). May.

CCI (CH2M Hill Constructors, Inc.), 2001. *Construction Documentation Report, Enhanced Biodegradation IRA at Study Area 39,* Naval Training Center, Orlando, Florida. March.

CCI, 2002. *Treatment Efficiency Report, Round 3 Groundwater Sampling Event, Study Area 39, Main Base,* Naval Training Center, Orlando, Florida. January.

FDEP (Florida Department of Environmental Protection), 1999. *Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C*. CEHR/TR-99-01. May.

HLA (Harding Lawson Associates), 1999. *Base Realignment and Closure Environmental Site Screening Report, Study Area 36, Naval Training Center, Orlando, Florida*. Unit Identification Code N65928, Contract Number N62467-89-D-0317/107. July.

NFESC (Naval Facilities Engineering Service Center), 1996. *Navy Installation Restoration Laboratory Quality Assurance Guide* (Interim Document), Port Hueneme, California.

TtNUS (Tetra Tech NUS, Inc.), 2000. *Work Plan for the Investigation of Contaminated Soil and Groundwater, Study Area 36, Naval Training Center, Orlando, Florida*. Contract No. N62467-D-0888. April.

TtNUS, 2002. *Operating Properly and Successfully Evaluation Report for Study Area 36 (Draft), Naval Training Center, Orlando, Florida*. Contract No. N62467-D-0888. April.

USDA (U.S. Department of Agriculture), 1989. *Soil Survey of Orange County, Florida*. Soil Conservation Service.

USEPA (U.S. Environmental Protection Agency), 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, EPA/540/G-89/004, OSWER Directive 9355.3-01. October.

USEPA, 1994. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* EPA/540/R-94/013, Office of Emergency and Remedial Response, Washington, D.C. February.

USEPA, 1996. *USEPA Guidance (Interim) for Evaluation of Federal Agency Demonstrations that Remedial Actions are Operating Properly and Successfully Under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h)(3)*. August.

USEPA, 1999. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review,* EPA/540/R-99/008, Office of Emergency and Remedial Response, Washington, D.C. October.

Wiedemier, T.M., M. Swansom, D. Moutoux, J. Wilson, D. Campbell, J. Hansen, and P. Haas, 1997. *Overview of the Technical Protocol for Natural Attenuation of Chlorinated Aliphatic Hydrocarbons in Groundwater Under Development for the U.S. Air Force Center for Environmental Excellence.* In Proceedings of the Symposium on Natural Attenuation of Chlorinated Organics in Groundwater.

APPENDIX A

BORING LOGS AND WELL COMPLETION FORMS

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: # 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120

BORING NUMBER: OLD-36-15
DATE: 11-Apr-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
1-ss	3		6 / 6	1058		loose	wht	SAND; fine-grnd, trace		dry	0	0	0	0
↓	5							silt & dk grains			0	0	0	0
2-ss	8		6 / 6	1104		loose	gry	SILTY SAND; fine- to med-grn		dry becoming v. wet	0	0	0	0
↓	10		6 / 2			hard	blk	SAND; fine-grnd		wet above hard layer	0	0	0	0
3-ss	13		6 / 6	1110		m. dense	d gr	SILTY SAND; fine- to med-grn		saturated, degraded	0	0	0	0
↓	15		2			v. dense	d br	SAND; fine-grnd		organic odor	0	0	0	0

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: Finger of black cemented sand @ 9.5 ft, encountered again @ 15 ft.

Drilling Area Background (ppm): 0

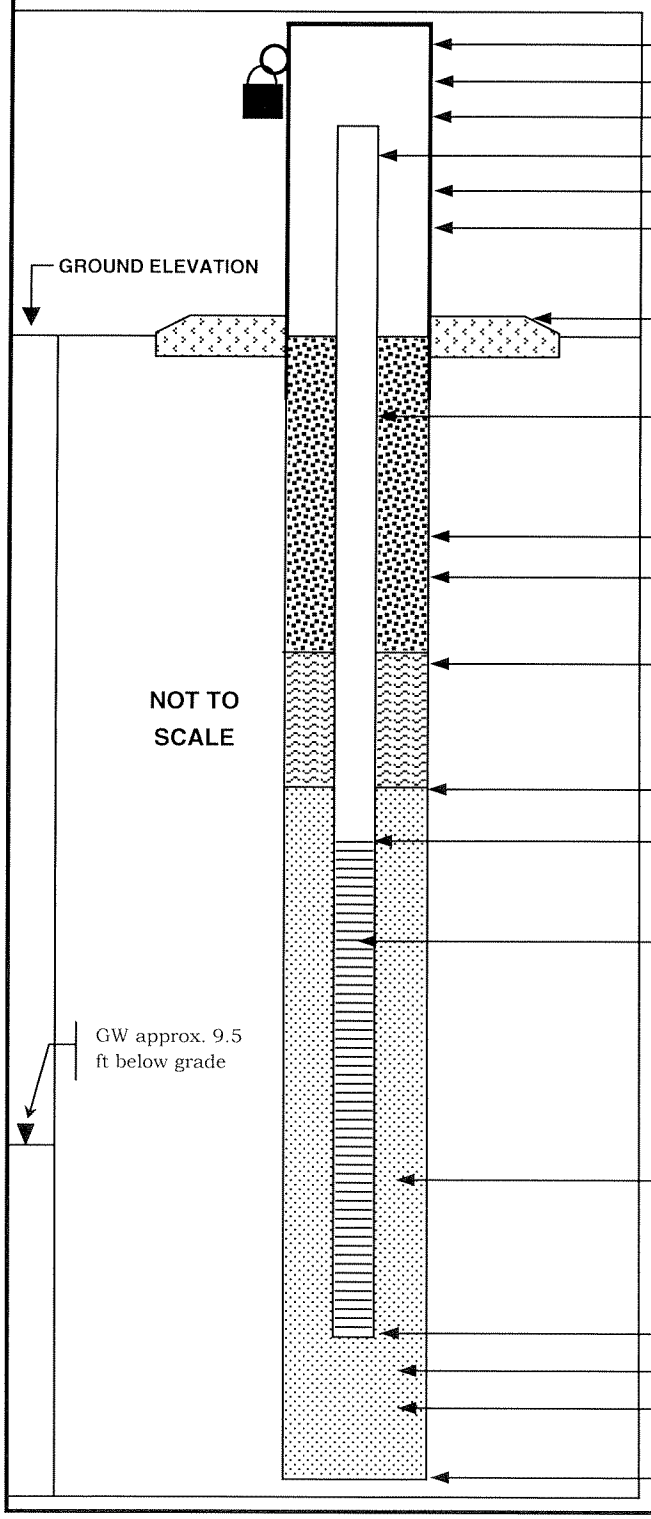
Converted to Well? (Yes) No

Well I.D. #: OLD-36-15A

WELL NO.: OLD-36-15A

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	15	METHOD:	
ELEVATION		DATE	11-Apr-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF SURFACE CASING:	
ELEVATION OF TOP OF RISER PIPE:	
STICK-UP TOP OF SURFACE CASING:	3.25 ft
STICK-UP OF RISER PIPE:	3 ft
I.D. OF SURFACE CASING:	4-in. square
TYPE OF SURFACE CASING:	stainless steel
TYPE OF SURFACE SEAL:	concrete
RISER PIPE I.D.:	2 in.
TYPE OF RISER PIPE:	SCH 40 PVC
BOREHOLE DIAMETER:	8.5 in.
TYPE OF SEAL:	Type I portland cement w/ powdered bentonite
ELEVATION / DEPTH OF SEAL:	2 ft
TYPE OF SEAL:	fine sand (30/65)
DEPTH - TOP OF SAND PACK:	3.5 ft
ELEVATION / DEPTH - TOP OF SCREEN:	5 ft
TYPE OF SCREEN:	SCH 40 PVC
SLOT SIZE X LENGTH:	0.010 in. X 10 ft
I.D. OF SCREEN:	2 in.
TYPE OF SAND PACK:	20/40
ELEVATION / DEPTH TO BOTTOM OF SCREEN:	15 ft
ELEVATION / DEPTH TO BOTTOM OF SAND PACK:	15.25 ft
TYPE OF BACKFILL BELOW MONITORING WELL:	cemented sand
ELEVATION / DEPTH TO BOTTOM OF BOREHOLE:	15.25 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120

BORING NUMBER: OLD-36-16
DATE: 14-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			0818				asphalt						
DIG							wht	gravel						
	3					loose	lt gry	SAND; silty, fine-grnd		dry	0	0	0	0
						loose	brn	SAND; silty, med.-grnd		moist	0	0	0	0
SOIL											0	0	0	0
CUTS														
								color now lt gry/brn			0	0	0	0
	12													
						mod dense	blk	SAND; silty, med-grnd		wet, "swamp" odor				
											0	0	0	0
	17										0	0	0	0
				0838										
								BORING TERMINATED						
								AT 17.5 FEET						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks:

Drilling Area Background (ppm): 0

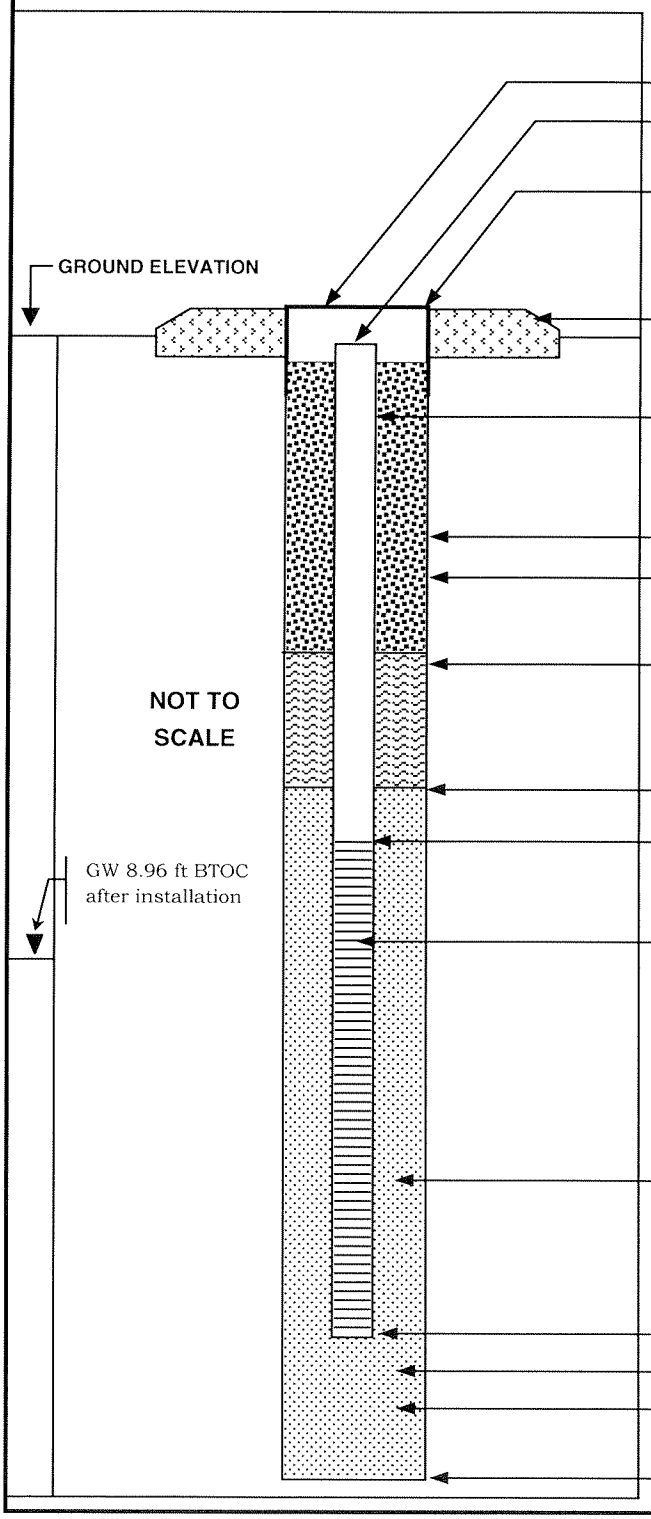
Converted to Well? Yes No

Well I.D. #: OLD-36-16A

WELL NO.: OLD-36-16A

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	16	METHOD:	
ELEVATION		DATE	14-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF DRIVE-OVER BOX: _____

ELEVATION OF TOP OF RISER PIPE: _____

I.D. OF DRIVE-OVER BOX: 8 in.

TYPE OF SURFACE CASING: cast iron w/ steel sides

TYPE OF SURFACE SEAL: concrete

RISER PIPE I.D.: 2 in.

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 10 in.

TYPE OF SEAL: Type I portland cement w/ powdered bentonite

ELEVATION / DEPTH OF SEAL: 3 ft

TYPE OF SEAL: 30/65 sand

DEPTH - TOP OF SAND PACK: 5 ft

ELEVATION / DEPTH - TOP OF SCREEN: 7 ft

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.006 in. X 10 ft

I.D. OF SCREEN: 2 in.

TYPE OF SAND PACK: 30/65

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 17 ft

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 18 ft

TYPE OF BACKFILL BELOW MONITORING WELL: dense or cemented fine sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 18 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120

BORING NUMBER: OLD-36-17
DATE: 14-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			0903				ASPHALT						
DIG							wht	GRAVEL						
	3					loose	lt gry	SAND; silty, fine-grnd		dry	0	0	0	0
						loose	brn	SAND; silty, med.-grnd		moist	0	0	0	0
SOIL											0	0	0	0
CUTS														
								color now lt gry/brn			0	0	0	0
	12													
						mod dense	blk	SAND; silty, med-grnd		wet, "swamp" odor				
											0	0	0	0
											0	0	0	0
	23													
				0936		dense	dk brn	SAND; fine-grnd, trace lighter		cemented, humic				
	25							colored reflective grains			0	0	0	0

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: Boring terminated at 25 feet.

Drilling Area Background (ppm): 0

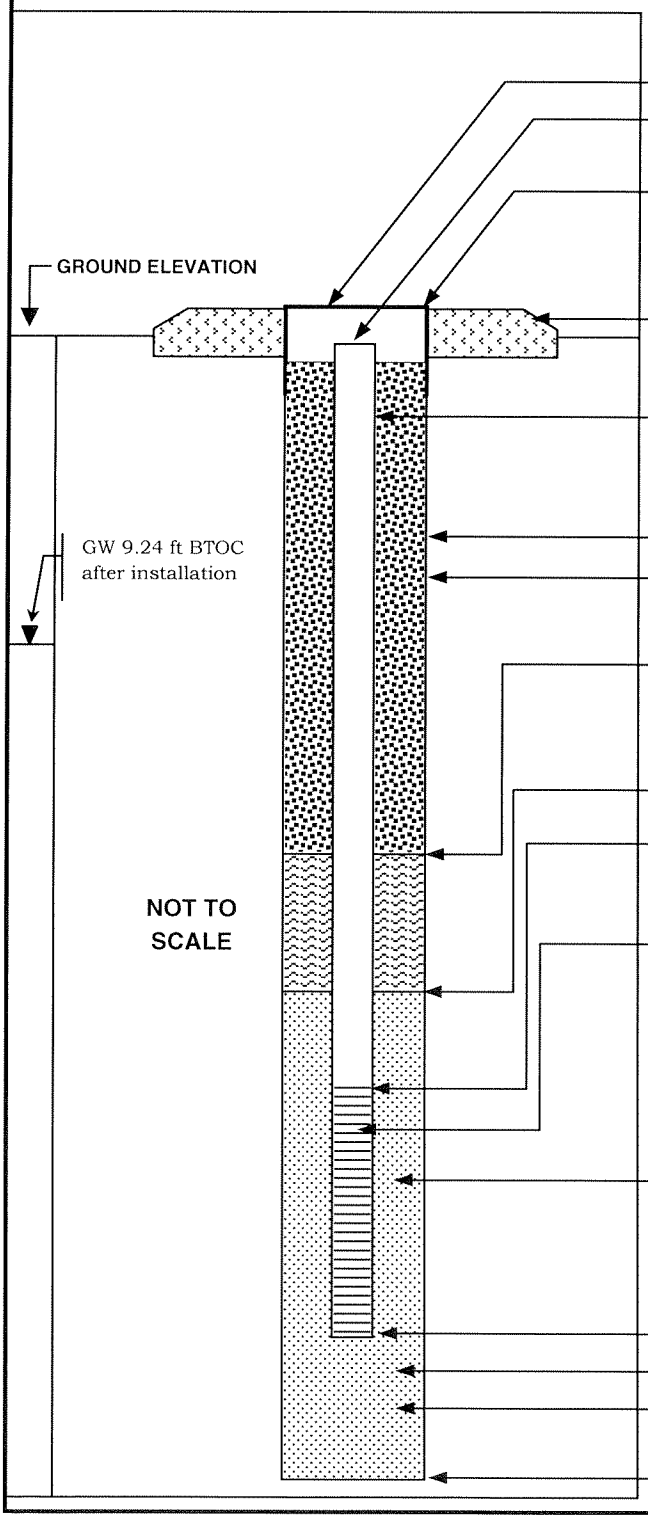
Converted to Well? Yes No

Well I.D. #: OLD-36-17B

WELL NO.: OLD-36-17B

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	17	METHOD:	
ELEVATION		DATE	14-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF DRIVE-OVER BOX: _____

ELEVATION OF TOP OF RISER PIPE: _____

I.D. OF DRIVE-OVER BOX: 8 in.

TYPE OF SURFACE CASING: cast iron w/ steel sides

TYPE OF SURFACE SEAL: concrete

RISER PIPE I.D.: 2 in.

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 10 in.

TYPE OF SEAL: Type I portland cement w/ powdered bentonite

ELEVATION / DEPTH OF SEAL: 14 ft

TYPE OF SEAL: 3/8 in. bentonite chips

DEPTH - TOP OF SAND PACK: 16 ft

ELEVATION / DEPTH - TOP OF SCREEN: 19 ft

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.006 in. X 5 ft

I.D. OF SCREEN: 2 in.

TYPE OF SAND PACK: 30/65

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 24 ft

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 25 ft

TYPE OF BACKFILL BELOW MONITORING WELL: fine sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 25 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120
BORING NUMBER: OLD-36-18
DATE: 14-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or RQD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			0834		loose	tan	SAND; fine-grnd, trace		dry	0	0	0	0
DIG								silt & dk grains			0	0	0	0
						loose	brn	SAND; silty, fine-grnd		dry	0	0	0	0
↓	4										0	0	0	0
SOIL											0	0	0	0
CUTS	6													
							lt gry	SAND; fine-grnd		moist				
											0	0	0	0
	13													
						m. dense	brn	SAND; silty, fine-grnd		v. wet				
	15										0	0	0	0
						dense	dk	SAND; fine- to med-grnd		dark color due to				
							brn			water staining, soil				
										dries to a lighter				
										color; saturated				
											0	0	0	0
	23													
						dense	dk	SAND; fine-grnd, trace lighter		hard, humic				
↓	25						brn	colored reflective grains			0	0	0	0

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well? (Yes) No

Well I.D. #: OLD-36-18C

PROJECT NAME: NTC Orlando
BORING NUMBER: OLD-36-18

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
SOIL	25					dense	blk	SAND; very fine-grnd, cemented		wet	0	0	0	0
CUTS														
	28													
						mod.	dk	SAND; med- to fine-grnd		saturated				
						dense	brn				0	0	0	0
	33													
						v. soft	olv	CLAYEY SAND		1-in. ribbon				
	35			1038			brn				0	0	0	0
								BORING TERMINATED AT 35 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm): 0

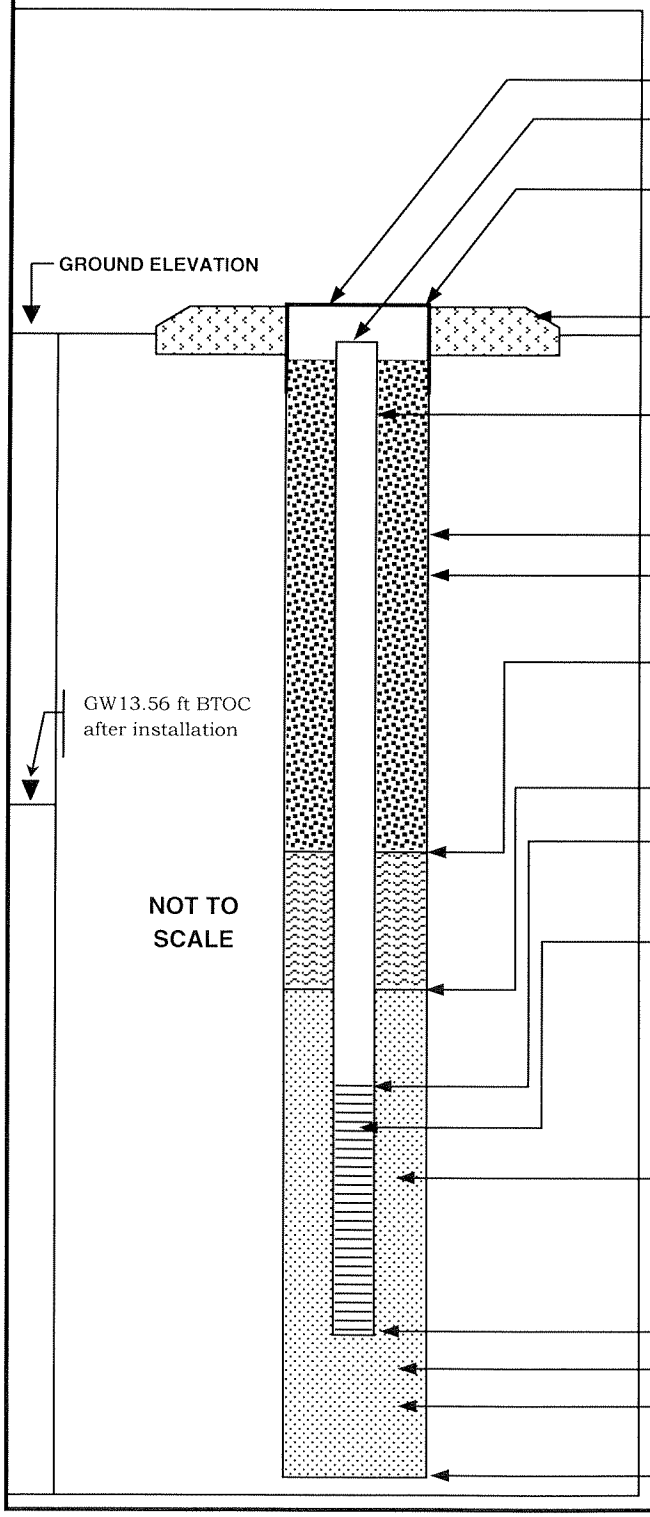
Converted to Well? (Yes) No

Well I.D. #: OLD-36-18C

WELL NO.: OLD-36-18C

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	18	METHOD:	
ELEVATION		DATE	14-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF DRIVE-OVER BOX: _____

ELEVATION OF TOP OF RISER PIPE: _____

I.D. OF DRIVE-OVER BOX: 8 in.

TYPE OF SURFACE CASING: cast iron w/ steel sides

TYPE OF SURFACE SEAL: concrete

RISER PIPE I.D.: 2 in.

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 10 in.

TYPE OF SEAL: Type I portland cement w/ powdered bentonite

ELEVATION / DEPTH OF SEAL: 24.5 ft

TYPE OF SEAL: 3/8 in. bentonite chips

DEPTH - TOP OF SAND PACK: 26.5 ft

ELEVATION / DEPTH - TOP OF SCREEN: 29.5 ft

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.006 in. X 5 ft

I.D. OF SCREEN: 2 in.

TYPE OF SAND PACK: 30/65

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 34.5 ft

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 35 ft

TYPE OF BACKFILL BELOW MONITORING WELL: sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 35.5 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120
BORING NUMBER: OLD-36-19
DATE: 14-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			1132			brn	TOPSOIL, sandy						
DIG						loose	lt gry	SAND; silty, fine-grnd						
	3									dry	0	0	0	0
						loose	brn	SAND; silty, med.-grnd		moist	0	0	0	0
SOIL														
CUTS														
								color now lt gry/brn			0	0	0	0
	12													
						mod dense	blk	SAND; silty, med-grnd		wet, "swamp" odor				
											0	0	0	0
	17										0	0	0	0
				1148										
								BORING TERMINATED						
								AT 17.5 FEET						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks:

Drilling Area Background (ppm): 0

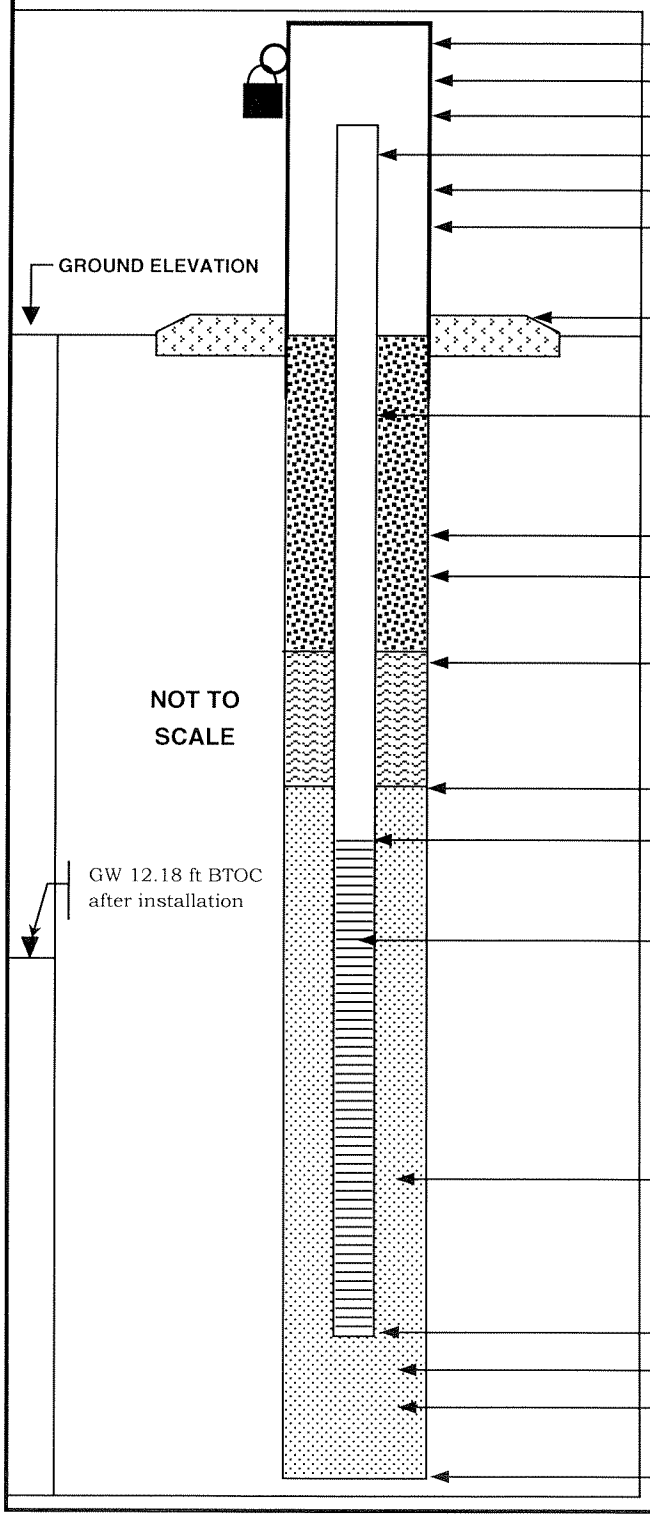
Converted to Well? Yes No

Well I.D. #: OLD-36-19A

WELL NO.: OLD-36-19A

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	19	METHOD:	
ELEVATION		DATE	14-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF SURFACE CASING: _____

ELEVATION OF TOP OF RISER PIPE: _____

STICK-UP TOP OF SURFACE CASING: 3 ft

STICK-UP OF RISER PIPE: 2.5 ft

I.D. OF SURFACE CASING: 4-in. square

TYPE OF SURFACE CASING: stainless steel

TYPE OF SURFACE SEAL: concrete

RISER PIPE I.D.: 2 in.

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8.25 in.

TYPE OF SEAL: Type I portland cement w/ powdered bentonite

ELEVATION / DEPTH OF SEAL: 3 ft

TYPE OF SEAL: 30/65

DEPTH - TOP OF SAND PACK: 5 ft

ELEVATION / DEPTH - TOP OF SCREEN: 6.9 ft

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.006 in. X 10 ft

I.D. OF SCREEN: 2 in.

TYPE OF SAND PACK: 30/65

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 16.9 ft

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 17.5 ft

TYPE OF BACKFILL BELOW MONITORING WELL: dense or cemented fine sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 17.5 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120
BORING NUMBER: OLD-36-20
DATE: 15-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			0834		loose	tan	SAND; fine-grnd, trace		dry	0	0	0	0
DIG								silt & dk grains			0	0	0	0
						loose	brn	SAND; silty, fine-grnd		dry	0	0	0	0
	4										0	0	0	0
SOIL														
CUTS	6													
							lt gry	SAND; fine-grnd		moist				
	13													
						m. dense	brn	SAND; silty, fine-grnd		v. wet				
	15													
						dense	d br	SAND; fine- to med-grnd		dark color due to				
										water staining, soil				
										dries to a lighter				
										color				
	23													
						dense	d br	SAND; fine-grnd, trace lighter		cemented, humic				
	25							colored reflective grains						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: Finger of black cemented sand @ 9.5 ft, encountered again @ 15 ft.

Drilling Area Background (ppm): 0

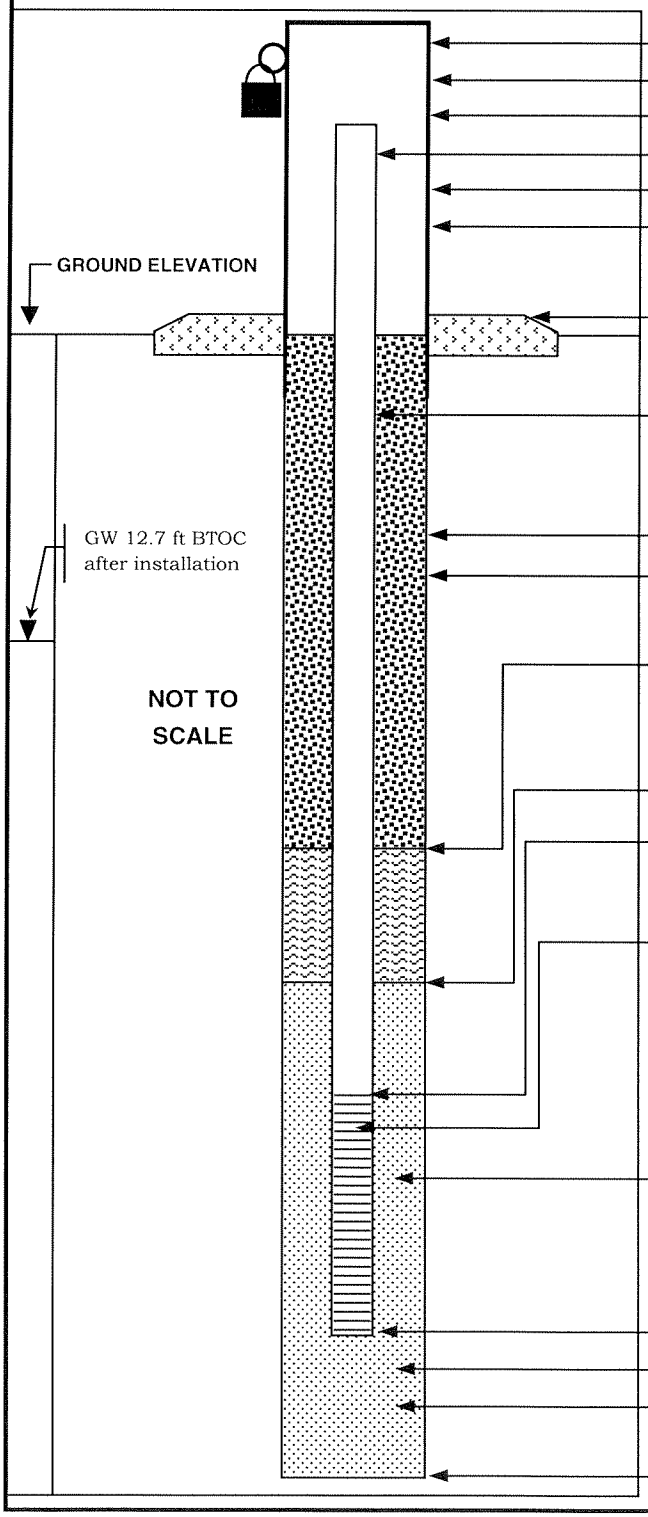
Converted to Well? Yes No

Well I.D. #: OLD-36-20B

WELL NO.: OLD-36-20B

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	20	METHOD:	
ELEVATION		DATE	15-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF SURFACE CASING:	
ELEVATION OF TOP OF RISER PIPE:	
STICK-UP TOP OF SURFACE CASING:	3 ft
STICK-UP OF RISER PIPE:	2.5 ft
I.D. OF SURFACE CASING:	4-in. square
TYPE OF SURFACE CASING:	stainless steel
TYPE OF SURFACE SEAL:	concrete
RISER PIPE I.D.:	2 in.
TYPE OF RISER PIPE:	SCH 40 PVC
BOREHOLE DIAMETER:	8.25 in.
TYPE OF SEAL:	Type I portland cement w/ powdered bentonite
ELEVATION / DEPTH OF SEAL:	14 ft
TYPE OF SEAL:	3/8 in bentonite chips
DEPTH - TOP OF SAND PACK:	16 ft
ELEVATION / DEPTH - TOP OF SCREEN:	19.13 ft
TYPE OF SCREEN:	SCH 40 PVC
SLOT SIZE X LENGTH:	0.006 in. X 5 ft
I.D. OF SCREEN:	2 in.
TYPE OF SAND PACK:	30/65
ELEVATION / DEPTH TO BOTTOM OF SCREEN:	24.13 ft
ELEVATION / DEPTH TO BOTTOM OF SAND PACK:	25 ft
TYPE OF BACKFILL BELOW MONITORING WELL:	fine sand
ELEVATION / DEPTH TO BOTTOM OF BOREHOLE:	25 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120
BORING NUMBER: OLD-36-21
DATE: 15-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			0834		loose	tan	SAND; fine-grnd, trace		dry	0	0	0	0
DIG								silt & dk grains			0	0	0	0
						loose	brn	SAND; silty, fine-grnd		dry	0	0	0	0
	4										0	0	0	0
SOIL											0	0	0	0
CUTS	6													
							lt gry	SAND; fine-grnd		moist				
											0	0	0	0
	13													
						m. dense	brn	SAND; silty, fine-grnd		v. wet				
	15										0	0	0	0
						dense	dk	SAND; fine- to med-grnd		dark color due to				
							brn			water staining, soil				
										dries to a lighter				
										color; saturated				
											0	0	0	0
	23													
						dense	dk	SAND; fine-grnd, trace lighter		hard, humic				
	25						brn	colored reflective grains			0	0	0	0

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well? (Yes) No

Well I.D. #: OLD-36-21C

PROJECT NAME: NTC Orlando
BORING NUMBER: OLD-36-21

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
SOIL	25					dense	blk	SAND; very fine-grnd, cemented		wet	0	0	0	0
CUTS														
	28													
						mod.	dk	SAND; med- to fine-grnd		saturated				
						dense	brn				0	0	0	0
	33													
						v. soft	olv	CLAYEY SAND		1-in. ribbon				
	35			1038			brn				0	0	0	0
								BORING TERMINATED AT 35 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm): 0

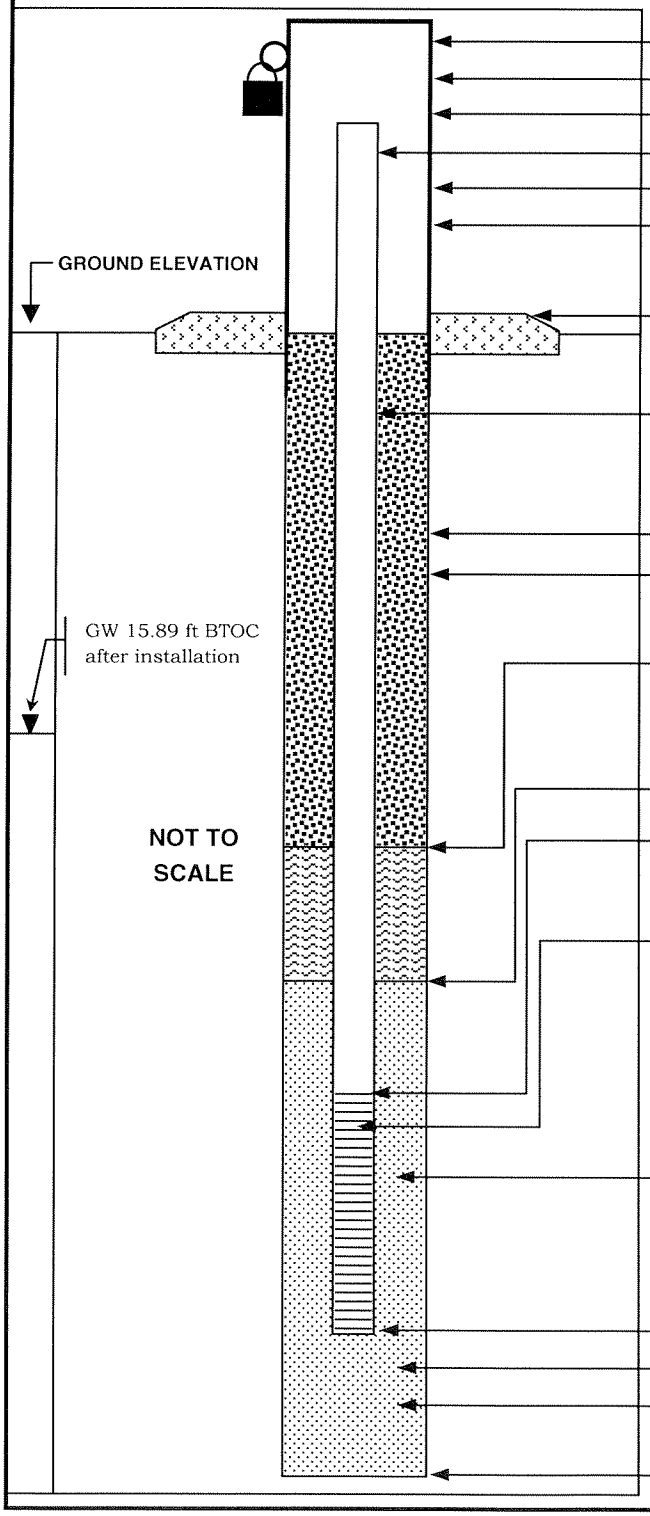
Converted to Well? (Yes) No

Well I.D. #: OLD-36-21C

WELL NO.: OLD-36-21C

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	21	METHOD:	
ELEVATION		DATE	15-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF SURFACE CASING: _____

ELEVATION OF TOP OF RISER PIPE: _____

STICK-UP TOP OF SURFACE CASING: 3 ft

STICK-UP OF RISER PIPE: 2.5 ft

I.D. OF SURFACE CASING: 4-in. square

TYPE OF SURFACE CASING: stainless steel

TYPE OF SURFACE SEAL: concrete

RISER PIPE I.D.: 2 in.

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8.25 in.

TYPE OF SEAL: Type I portland cement w/ powdered bentonite

ELEVATION / DEPTH OF SEAL: 23 ft

TYPE OF SEAL: 3/8 in bentonite chips

DEPTH - TOP OF SAND PACK: 25 ft

ELEVATION / DEPTH - TOP OF SCREEN: 28 ft

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.006 in. X 5 ft

I.D. OF SCREEN: 2 in.

TYPE OF SAND PACK: 30/65

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 32 ft

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 34 ft

TYPE OF BACKFILL BELOW MONITORING WELL: fine sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 35 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120

BORING NUMBER: OLD-36-22
DATE: 15-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			0834		loose	tan	SAND; fine-grnd, trace		dry	0	0	0	0
DIG								silt & dk grains			0	0	0	0
						loose	brn	SAND; silty, fine-grnd		dry	0	0	0	0
↓	4										0	0	0	0
SOIL														
CUTS	6													
							lt gry	SAND; fine-grnd		moist				
	13													
						m. dense	brn	SAND; silty, fine-grnd		v. wet				
	15													
						dense	d br	SAND; fine- to med-grnd		dark color due to				
										water staining, soil				
										dries to a lighter				
										color				
	23													
						dense	d br	SAND; fine-grnd, trace lighter		cemented, humic				
↓	25							colored reflective grains						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: Boring terminated at 25 feet.

Drilling Area Background (ppm): 0

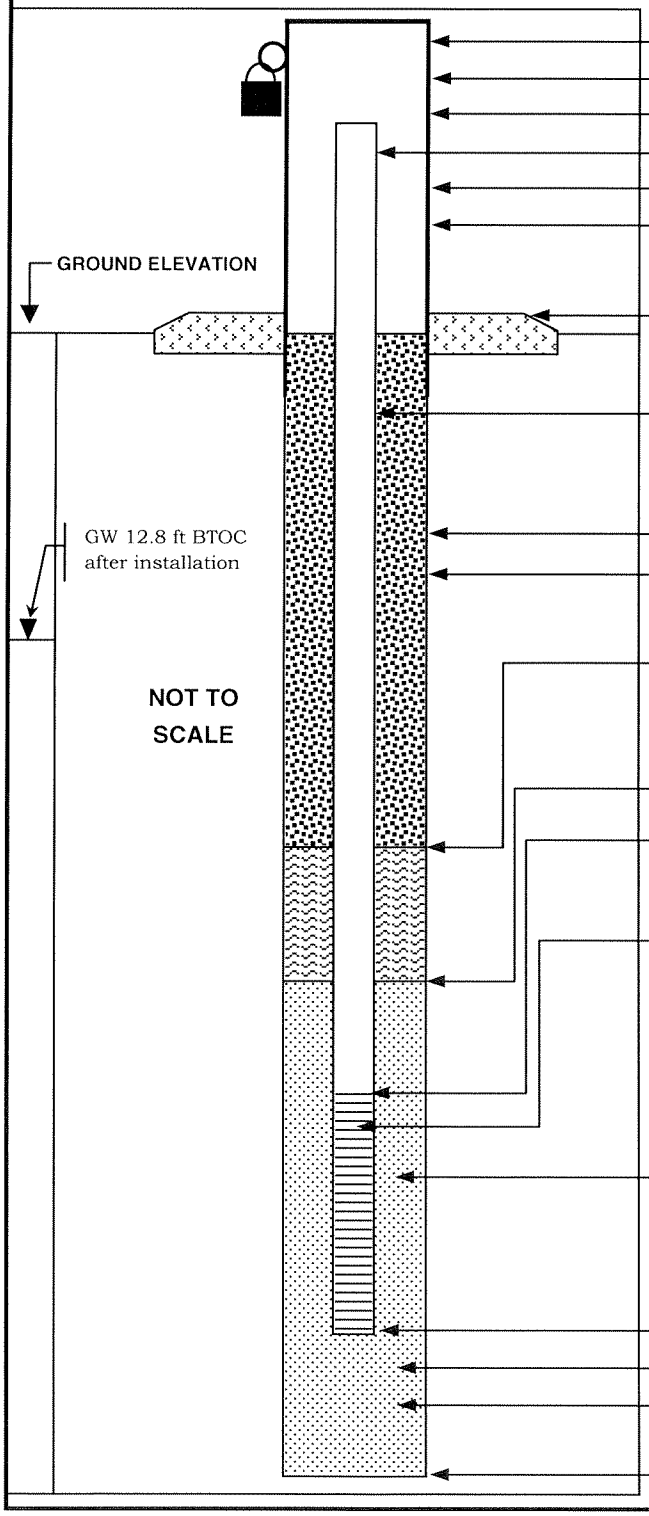
Converted to Well? (Yes) No

Well I.D. #: OLD-36-22B

WELL NO.: OLD-36-22B

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	22	METHOD:	
ELEVATION		DATE	15-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF SURFACE CASING:

ELEVATION OF TOP OF RISER PIPE:

STICK-UP TOP OF SURFACE CASING: 3 ft

STICK-UP OF RISER PIPE: 2.5 ft

I.D. OF SURFACE CASING: 4-in. square

TYPE OF SURFACE CASING: stainless steel

TYPE OF SURFACE SEAL: concrete

RISER PIPE I.D.: 2 in.

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 8.25 in.

TYPE OF SEAL: Type I portland cement w/ powdered bentonite

ELEVATION / DEPTH OF SEAL: 14 ft

TYPE OF SEAL: 3/8 in bentonite chips

DEPTH - TOP OF SAND PACK: 16 ft

ELEVATION / DEPTH - TOP OF SCREEN: 19.56 ft

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.006 in. X 5 ft

I.D. OF SCREEN: 2 in.

TYPE OF SAND PACK: 30/65

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 24.56 ft

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 25 ft

TYPE OF BACKFILL BELOW MONITORING WELL: fine sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 25 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120
BORING NUMBER: OLD-36-23
DATE: 15-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			1331		loose	tan	SAND; fine-grnd, trace		dry	0	0	0	0
DIG								silt & dk grains			0	0	0	0
						loose	brn	SAND; silty, fine-grnd		dry	0	0	0	0
↓	4										0	0	0	0
SOIL											0	0	0	0
CUTS	6													
							lt gry	SAND; fine-grnd		moist				
											0	0	0	0
	13													
						m. dense	brn	SAND; silty, fine-grnd		v. wet				
	15										0	0	0	0
						dense	dk	SAND; fine- to med-grnd		dark color due to				
							brn			water staining, soil				
										dries to a lighter				
										color; saturated				
											0	0	0	0
	23													
						dense	dk	SAND; fine-grnd, trace lighter		hard, humic				
↓	25						brn	colored reflective grains			0	0	0	0

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well? (Yes) No

Well I.D. #: OLD-36-23C

PROJECT NAME: NTC Orlando
BORING NUMBER: OLD-36-23

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
SOIL														
CUTS	27													
						dense	blk	SAND; very fine-grnd, cemented		wet				
	29													
						mod.	brn	SAND; med- to fine-grnd, some		saturated	0	0	0	0
						dense		clay						
	33													
	35			1347							0	0	0	0
								BORING TERMINATED AT 35 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm): 0

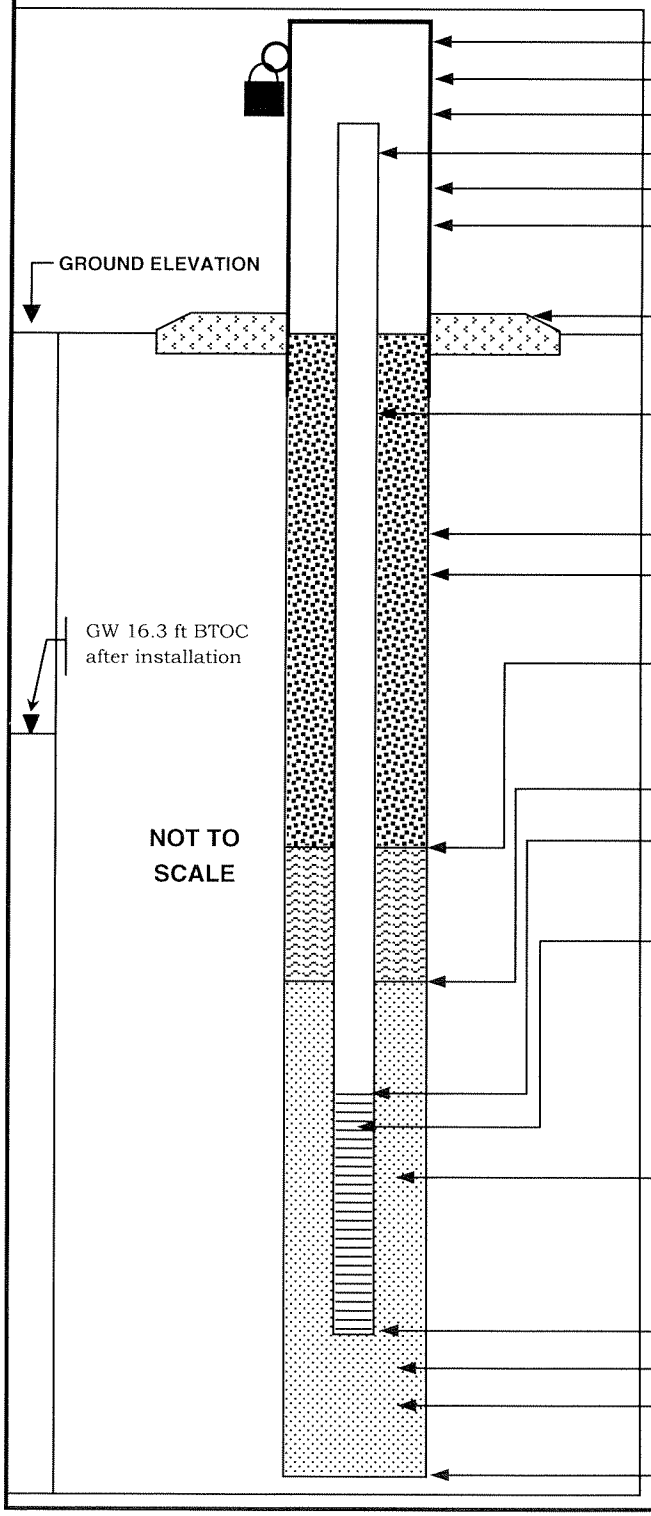
Converted to Well? (Yes) No

Well I.D. #: OLD-36-23C

WELL NO.: OLD-36-23C

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	23	METHOD:	
ELEVATION		DATE	15-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF SURFACE CASING:	
ELEVATION OF TOP OF RISER PIPE:	
STICK-UP TOP OF SURFACE CASING:	3 ft
STICK-UP OF RISER PIPE:	2.5 ft
I.D. OF SURFACE CASING:	4-in. square
TYPE OF SURFACE CASING:	stainless steel
TYPE OF SURFACE SEAL:	concrete
RISER PIPE I.D.:	2 in.
TYPE OF RISER PIPE:	SCH 40 PVC
BOREHOLE DIAMETER:	8.25 in.
TYPE OF SEAL:	Type I portland cement w/ powdered bentonite
ELEVATION / DEPTH OF SEAL:	24 ft
TYPE OF SEAL:	3/8 in bentonite chips
DEPTH - TOP OF SAND PACK:	26 ft
ELEVATION / DEPTH - TOP OF SCREEN:	29.3 ft
TYPE OF SCREEN:	SCH 40 PVC
SLOT SIZE X LENGTH:	0.006 in. X 5 ft
I.D. OF SCREEN:	2 in.
TYPE OF SAND PACK:	30/65
ELEVATION / DEPTH TO BOTTOM OF SCREEN:	34.3 ft
ELEVATION / DEPTH TO BOTTOM OF SAND PACK:	35 ft
TYPE OF BACKFILL BELOW MONITORING WELL:	fine sand
ELEVATION / DEPTH TO BOTTOM OF BOREHOLE:	35 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120

BORING NUMBER: OLD-36-24
DATE: 16-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Rcovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			0814				ASPHALT						
DIG							wht	GRAVEL						
	3					loose	lt gry	SAND; silty, fine-grnd		dry	0	0	0	0
↓						loose	brn	SAND; silty, med.-grnd		moist	0	0	0	0
SOIL											0	0	0	0
CUTS														
								color now lt gry/brn			0	0	0	0
	12													
						mod dense	blk	SAND; silty, med-grnd		wet, "swamp" odor				
											0	0	0	0
											0	0	0	0
	23													
				0836		dense	dk brn	SAND; fine-grnd, trace lighter		cemented, humic				
↓	25							colored reflective grains			0	0	0	0

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: Boring terminated at 25 feet.

Drilling Area Background (ppm): 0

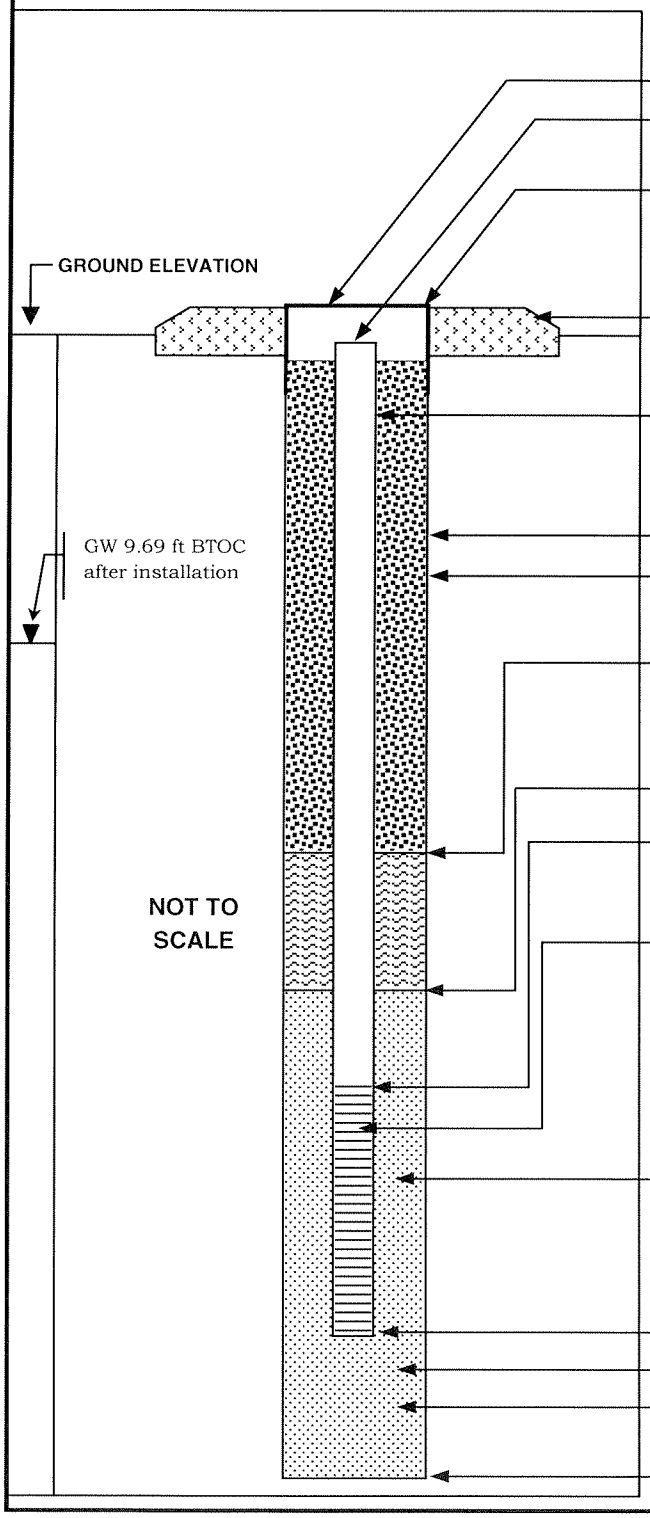
Converted to Well? (Yes) No

Well I.D. #: OLD-36-24B

WELL NO.: OLD-36-24B

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	24	METHOD:	
ELEVATION		DATE	14-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF DRIVE-OVER BOX: _____

ELEVATION OF TOP OF RISER PIPE: _____

I.D. OF DRIVE-OVER BOX: 8 in.

TYPE OF SURFACE CASING: cast iron w/ steel sides

TYPE OF SURFACE SEAL: concrete

RISER PIPE I.D.: 2 in.

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 10 in.

TYPE OF SEAL: Type I portland cement w/ powdered bentonite

ELEVATION / DEPTH OF SEAL: 14 ft

TYPE OF SEAL: 3/8 in. bentonite chips

DEPTH - TOP OF SAND PACK: 16 ft

ELEVATION / DEPTH - TOP OF SCREEN: 19 ft

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.006 in. X 5 ft

I.D. OF SCREEN: 2 in.

TYPE OF SAND PACK: 30/65

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 24 ft

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 25 ft

TYPE OF BACKFILL BELOW MONITORING WELL: dense or cemented fine sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 25 ft

BORING LOG

PROJECT NAME: NTC Orlando
PROJECT NUMBER: 7457
DRILLING COMPANY: Groundwater Protection Inc.
DRILLING RIG: Diedrich 120
BORING NUMBER: OLD-36-25
DATE: 16-Aug-00
GEOLOGIST: Skip Barton
DRILLER: Nick Smarrito

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
HAND	0			0918				ASPHALT						
DIG							wht	GRAVEL						
	3					loose	lt gry	SAND; silty, fine-grnd		dry	0	0	0	0
						loose	brn	SAND; silty, med.-grnd		moist	0	0	0	0
SOIL											0	0	0	0
CUTS														
								color now lt gry/brn			0	0	0	0
	12													
						mod dense	blk	SAND; silty, med-grnd		wet, "swamp" odor				
											0	0	0	0
											0	0	0	0
	23													
				0836		dense	dk brn	SAND; fine-grnd, trace lighter		cemented, humic				
	25							colored reflective grains			0	0	0	0

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well? (Yes) No

Well I.D. #: OLD-36-25C

PROJECT NAME: NTC Orlando
BORING NUMBER: OLD-36-21

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
SOIL	25					dense	blk	SAND; very fine-grnd, cemented		wet	0	0	0	0
CUTS														
	28													
						mod.	dk	SAND; med- to fine-grnd		saturated				
						dense	brn				0	0	0	0
	33													
						v. soft	olv	CLAYEY SAND		1-in. ribbon				
	35			0952			brn				0	0	0	0
								BORING TERMINATED AT 35 FEET						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm): 0

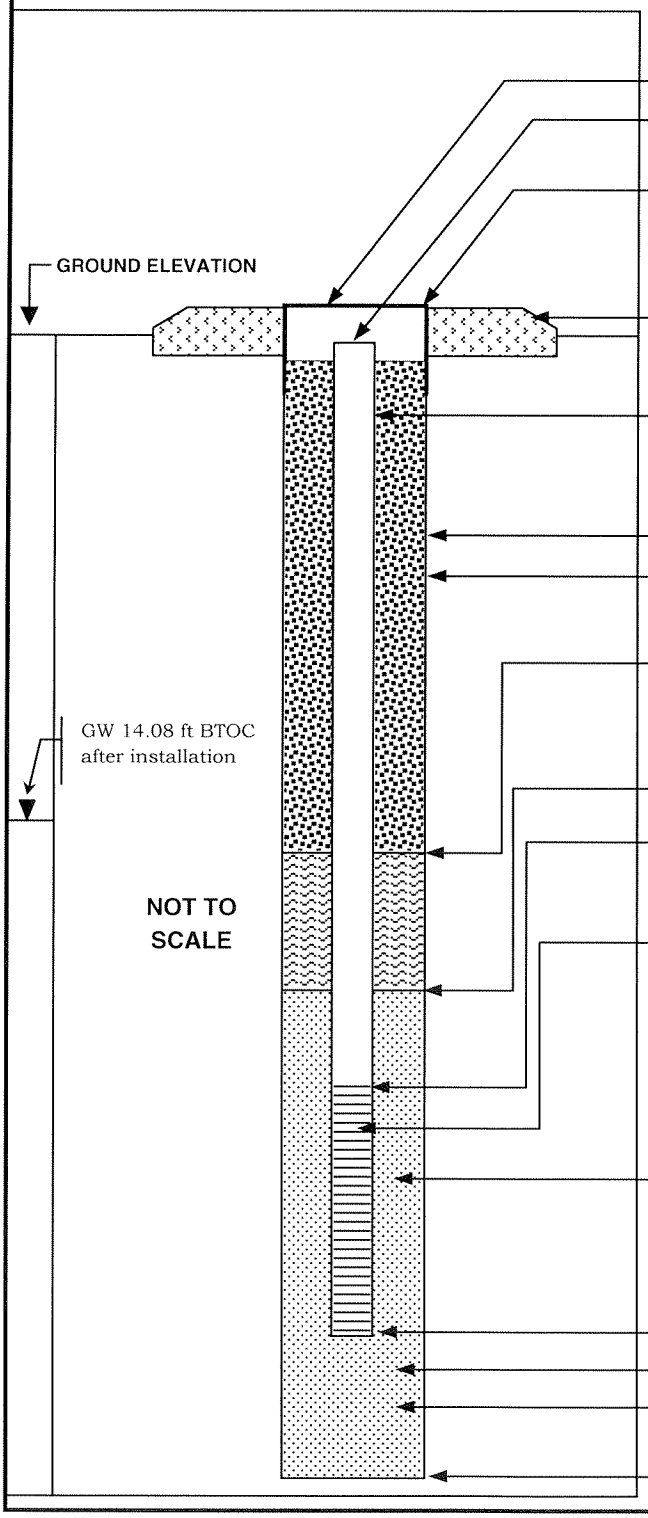
Converted to Well? (Yes) No

Well I.D. #: OLD-36-25C

WELL NO.: OLD-36-25C

OVERBURDEN MONITORING WELL SHEET

PROJECT	NTC Orlando	LOCATION	SA 36 - Main Base	DRILLER	Nick Smarrito-GPI
PROJECT NO.	7457	BORING	25	METHOD:	
ELEVATION		DATE	16-Aug-00	DRILLING	HSA
FIELD GEOLOGIST	Skip Barton			DEVELOPMENT	sub pump



ELEVATION OF TOP OF DRIVE-OVER BOX: _____

ELEVATION OF TOP OF RISER PIPE: _____

I.D. OF DRIVE-OVER BOX: 8 in.

TYPE OF SURFACE CASING: cast iron w/ steel sides

TYPE OF SURFACE SEAL: concrete

RISER PIPE I.D.: 2 in.

TYPE OF RISER PIPE: SCH 40 PVC

BOREHOLE DIAMETER: 10 in.

TYPE OF SEAL: Type I portland cement w/ powdered bentonite

ELEVATION / DEPTH OF SEAL: 24.5 ft

TYPE OF SEAL: 3/8 in. bentonite chips

DEPTH - TOP OF SAND PACK: 26.5 ft

ELEVATION / DEPTH - TOP OF SCREEN: 29.5 ft

TYPE OF SCREEN: SCH 40 PVC

SLOT SIZE X LENGTH: 0.006 in. X 5 ft

I.D. OF SCREEN: 2 in.

TYPE OF SAND PACK: 30/65

ELEVATION / DEPTH TO BOTTOM OF SCREEN: 34.5 ft

ELEVATION / DEPTH TO BOTTOM OF SAND PACK: 35 ft

TYPE OF BACKFILL BELOW MONITORING WELL: dense or cemented fine sand

ELEVATION / DEPTH TO BOTTOM OF BOREHOLE: 35.5 ft

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-26A	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando — LOCATION : SA-36

ELEVATION : 117.89 TOC — DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 12.40 ft btoc — START : 11/8/00 09:00 — END : 10:00 — LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	22/24	SS-2"	3-3-3-3 (6)	Very Pale Brown (10 YR 8/3), dry, loose, medium sand (SP), well-sorted, subangular	Headspace = 673 ppm Background = 0.0 - 0.5 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 84 °F
10	10 to 12	22/24	SS-2"	3-5-17-34 (22)	Top 11", Very Pale Brown (10 YR 8/3) to Gray (10 YR 5/1), damp, loose, medium sand (SP), well-sorted, subangular Bottom 11", Very Dark Grayish Brown (10 YR 3/2), damp, medium dense, silty fine sand (SM), fairly well-sorted, subangular	Headspace = 823.9 ppm Background = 0.0 - 0.5 ppm Soil Temperature = 85 °F
15	15 to 17	24/24	SS-2"	2-1-1-2 (2)	Very Dark Grayish Brown (10 YR 3/2), wet, very loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular, mottled in color	Headspace = 272.2 ppm Background = 0.0 - 0.5 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 83 °F
20	20 to 22	24/24	SS-2"	4-4-9-17 (13)	Same as above, but medium dense	Headspace = 253.9 ppm Background = 0.0 - 0.5 ppm Soil Temperature = 84 °F
					End of Boring at 20.0 ft	
25						

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-26A	SHEET 1 OF 1

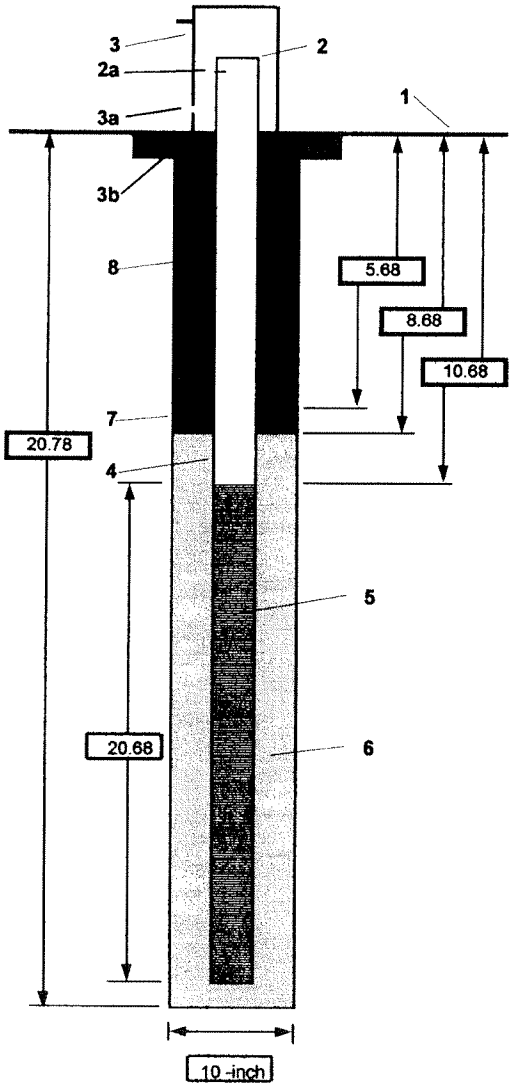
WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 12.40 ft btoc START : 11/8/00 09:00 END : 10:00 LOGGER : Kim-Lee Murphy



1- Ground elevation at well: 115.5

2- Top of casing elevation: 117.89
a) vent hole?: No

3- Wellhead protection cover type: 4-inch Steel Sleeve above grade protector
a) weep hole?: No
b) concrete pad dimensions: 2-ft by 2-ft

4- Dia./type of well casing: 2-inch diameter PVC

5- Type/slot size of screen: 2-inch diameter PVC, 0.010-inch slot screen

6- Type screen filter: 30/45 Standard Silica Sand
a) Quantity used: 8 50-pound bags

7- Type of seal: Pre-hydrated Bentonite (Kwikgel)
a) Quantity used: 12.5 pounds
30/65 Standard Silica Sand
b) Quantity used: 25 pounds

8- Grout
a) Grout mix used: Holnam 1 Portland Cement with Kwikgel
b) Method of placement: Tremie Pipe
c) Vol. of well casing grout: 4 92.6-pound bags

Development method: Swabbing with Surge Block and Pumping

Development time: 24 minutes

Estimated purge volume: 110 gallons

Comments
Northing = 1537878.13
Easting = 549510.67

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-26A	SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DEVELOPMENT CONTRACTOR : Groundwater Protection

DEVELOPMENT METHOD AND EQUIP USED : Swabbing and Pumping; Pump from Dietrich 120 mobile drill rig (centrifugal), tremie pipe and surge block

START WATER LEVELS : 12.46 ft btoc START : 11/20/00 13:05 END : 13:29 LOGGER : Kim-Lee Murphy

MAXIMUM DRAWDOWN DURING PUMPING: 0.32 ft

TOTAL QUANTITY OF WATER DISCHARGED: 110 gallons

DISPOSITION OF DISCHARGE WATER: Turbid

OVM readings taken above water purging out of well into 55-gallon drum.

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (mS/cm)	Remarks (color, odor, sheen, sediment, etc.)
13:10	0	12.46	>999	25.4	5.23	0.106	Dark Brown, Salinity = 0.00
13:13	17	No Reading	>999	25.5	5.36	0.101	Dark Brown, Salinity = 0.00
13:17	32	No Reading	>999	27.3	5.41	0.102	Dark Brown, Salinity = 0.00
13:20	55	No Reading	>999	26.6	5.35	0.113	Dark Brown, Salinity = 0.00 OVM = 102.9 ppm, Background = 3.7 ppm
13:23	70	No Reading	>999	26.8	5.28	0.114	Dark Brown, Salinity = 0.00
13:26	80	No Reading	>999	26.3	5.31	0.107	Dark Brown, Salinity = 0.00 OVM = 307.5 ppm, Background = 3.7 ppm
13:29	110	12.78	>999	26.4	5.22	0.107	Dark Brown, Salinity = 0.00

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-27A	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando — LOCATION : SA-36

ELEVATION : 118.01 TOC — DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

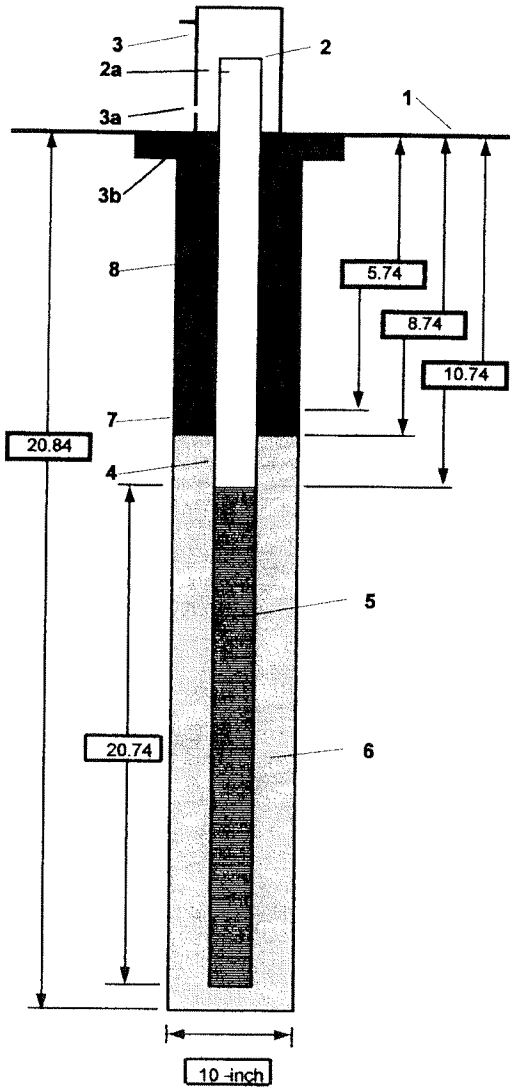
WATER LEVELS : 12.61 ft btoc — START : 11/8/00 15:55 — END : 16:36 — LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	24/24	SS-2"	2-4-4-6 (8)	Very Pale Brown (10 YR 8/3), dry, loose, medium sand (SP), well-sorted, subangular	Headspace = 0.0 ppm** Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 84 °F
10	10 to 12	17/24	SS-2"	4-5-16-18 (21)	Top 2", Very Pale Brown (10 YR 8/3), damp, loose, medium sand (SP), well-sorted, subangular Mid 1", Limestone Ash Bottom 14", Dark Grayish Brown (10 YR 4/2) damp to wet, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 0.0 ppm** Background = 0.0 ppm Soil Temperature = 82 °F
15	15 to 17	24/24	SS-2"	5-2-1-3 (3)	Dark Grayish Brown (10 YR 4/2), damp to wet, very loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 287.9 ppm** Background = 0.0 ppm Soil Temperature = 82 °F
20	20 to 22	24/24	SS-2"	1-4-8-12 (12)	Same as above, but medium dense with sporadic lime ash	Background = 287.9 ppm** Soil Temperature = 81 °F
					End of Boring at 20.0 ft	
25						** PID has low battery. Does NOT appear to be working properly.

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-27A	SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 12.61 ft btoc START : 11/8/00 15:55 END : 16:36 LOGGER : Kim-Lee Murphy



1- Ground elevation at well: 115.4

2- Top of casing elevation: 118.01
a) vent hole?: No

3- Wellhead protection cover type: 4-inch Steel Sleeve above grade protector
a) weep hole?: No
b) concrete pad dimensions: 2-ft by 2-ft

4- Dia./type of well casing: 2-inch diameter PVC

5- Type/slot size of screen: 2-inch diameter PVC, 0.010-inch slot screen

6- Type screen filter: 30/45 Standard Silica Sand
a) Quantity used: 8 50-pound bags

7- Type of seal: Pre-hydrated Bentonite (Kwikgel)
a) Quantity used: 12.5 pounds
30/65 Standard Silica Sand
b) Quantity used: 25 pounds

8- Grout
a) Grout mix used: Holnam 1 Portland Cement with Kwikgel
b) Method of placement: Tremie Pipe
c) Vol. of well casing grout: 4 92.6-pound bags

Development method: Swabbing with Surge Block and Pumping

Development time: 40 minutes

Estimated purge volume: 36 gallons

Comments
Northing = 1537896.05
Easting = 549508.93

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-27A SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DEVELOPMENT CONTRACTOR : Groundwater Protection

DEVELOPMENT METHOD AND EQUIP USED : Swabbing and Pumping; Pump from Dietrich 120 mobile drill rig (centrifugal), tremie pipe and surge block

START WATER LEVELS : 12.77 ft btoc START : 11/20/00 10:30 END : 11:10 LOGGER : Kim-Lee Murphy

MAXIMUM DRAWDOWN DURING PUMPING: dry

TOTAL QUANTITY OF WATER DISCHARGED: 36 gallons

DISPOSITION OF DISCHARGE WATER: Clear

Note: Well continuously purging dry every few minutes. Well pumped dry 5 times.

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (mS/cm)	Remarks (color, odor, sheen, sediment, etc.)
10:35	0	12.46	>999	24.2	6.11	0.373	Dark Brown, Salinity = 0.01
10:37	2	No Reading	>999	23.8	6.26	0.413	Dark Brown, Salinity = 0.01
10:42	8	No Reading	>999	25.8	6.36	0.456	Dark Brown, Salinity = 0.01
10:48	13	No Reading	>999	26.6	6.42	0.438	Dark Brown, Salinity = 0.01
10:54	16	No Reading	>999	27.2	6.66	0.435	Dark Brown, Salinity = 0.01
10:58	18	No Reading	770	25.2	6.56	0.416	Dark Brown, Salinity = 0.01
11:05	30	No Reading	170	27.9	6.65	0.430	Very Light Brown, Salinity = 0.01
11:10	36	Dry	114	25.8	6.67	0.428	Very Light Brown, Salinity = 0.01
11:25	—	13.30	—	—	—	—	

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-28B	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : 117.97 TOC
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 13.29 ft btoc
START : 11/10/00 09:30
END : 11:24
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	17/24	SS-2"	3-3-3-5 (6)	Very Pale Brown (10 YR 8/3), dry, loose, medium sand (SP), well-sorted, subangular	Headspace = 47.8 ppm Background = 0.0 - 0.2 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 80 °F
10	10 to 12	20/24	SS-2"	7-8-21-19 (29)	Top 8", Grayish Brown (10 YR 5/2), damp, medium dense, silty medium sand (SP/SM), fairly poorly sorted, subangular Bottom 12", Very Dark Brown (10 YR 2/2), wet, medium dense, silty fine sand (SM), fairly well sorted, subangular	Headspace = 75.0 ppm Background = 0.0 - 0.2 ppm Soil Temperature = 81 °F
15	15 to 17	20/24	SS-2"	2-2-3-3 (5)	Very Dark Grayish Brown (10 YR 3/2), wet, loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 52.5 ppm Background = 0.0 - 0.2 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 81 °F
20	20 to 22	14/24	SS-2"	5-10-11-10 (21)	Same as above, but medium dense, predominantly medium sand	Headspace = 47.3 ppm Background = 0.0 - 0.2 ppm Soil Temperature = 81 °F
25	25 to 27	24/24	SS-2"	3-3-15-11 (18)	Same as above, increase in silt content with depth End of Boring at 25.0 ft	Headspace = 37.0 ppm Background = 0.0 - 0.2 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 81 °F

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-28B	SHEET 1 OF 1

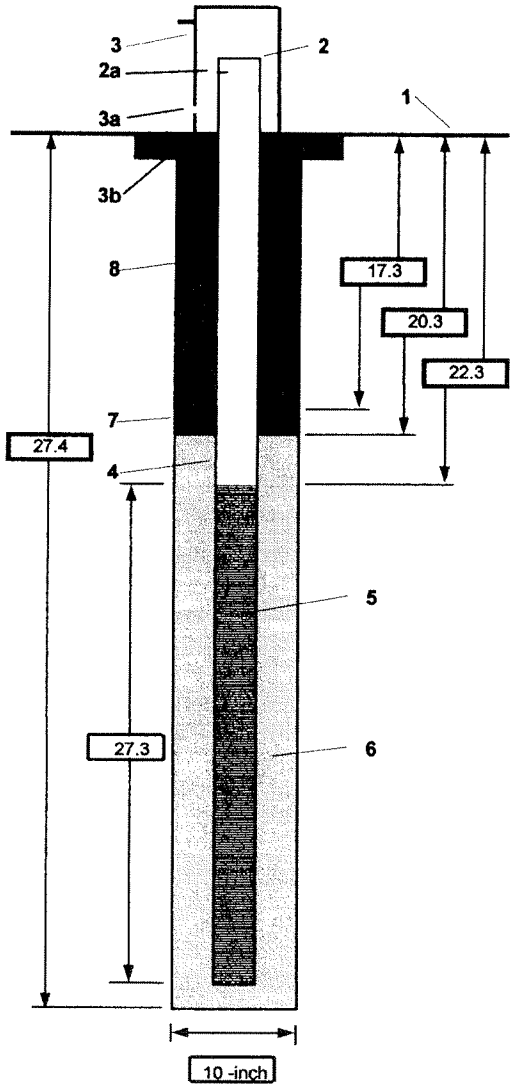
WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 13.29 ft btoc START : 11/10/00 09:30 END : 11:24 LOGGER : Kim-Lee Murphy



1- Ground elevation at well: 115.0

2- Top of casing elevation: 117.97
a) vent hole?: No

3- Wellhead protection cover type: 4-inch Steel Sleeve above grade protector
a) weep hole?: No
b) concrete pad dimensions: 2-ft by 2-ft

4- Dia./type of well casing: 2-inch diameter PVC

5- Type/slot size of screen: 2-inch diameter PVC, 0.010-inch slot screen

6- Type screen filter: 30/45 Standard Silica Sand
a) Quantity used: 7 50-pound bags

7- Type of seal: Pre-hydrated Bentonite (Kwikgel)
a) Quantity used: 12.5 pounds
30/65 Standard Silica Sand
b) Quantity used: 25 pounds

8- Grout
a) Grout mix used: Holnam 1 Portland Cement with Kwikgel
b) Method of placement: Tremie Pipe
c) Vol. of well casing grout: 5 92.6-pound bags

Development method: Swabbing with Surge Block and Pumping

Development time: 55 minutes

Estimated purge volume: 17 gallons

Comments
Northing = 1537899.26
Easting = 549507.42

CH2MHILL

PROJECT NUMBER	WELL NUMBER
152044.32.12.01.08	OLD-36-28B SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DEVELOPMENT CONTRACTOR : Groundwater Protection

DEVELOPMENT METHOD AND EQUIP USED : Swabbing and Pumping; Pump from Dietrich 120 mobile drill rig (centrifugal), tremie pipe and surge block

START WATER LEVELS : 13.05 ft btoc START : 11/20/00 09:23 END : 10:25 LOGGER : Kim-Lee Murphy

MAXIMUM DRAWDOWN DURING PUMPING: dry

TOTAL QUANTITY OF WATER DISCHARGED: 17 gallons

DISPOSITION OF DISCHARGE WATER: Turbid

OVM readings taken above water purging out of well into 55-gallon drum.

Note: Well continuously purging dry every minute, even with lower flow rate. Well pumped dry over 7 times.

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (mS/cm)	Remarks (color, odor, sheen, sediment, etc.)
9:25	0	13.05	>999	24.4	5.89	0.428	Dark Brown, Salinity = 0.01
10:04	12	No Reading	>999	33.2	6.44	0.635	Dark Brown, Salinity = 0.02 OVM = 24.6 ppm, Background = 4.9 ppm
10:09	15	No Reading	>999	31.3	6.76	0.606	Dark Brown, Salinity = 0.02
10:15	16	No Reading	>999	33.4	6.87	0.567	Dark Brown, Salinity = 0.02
10:35	—	16.00	—	—	—	—	

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	BORING NUMBER OLD-36-29B	SHEET 1 OF 1

SOIL BORING LOG

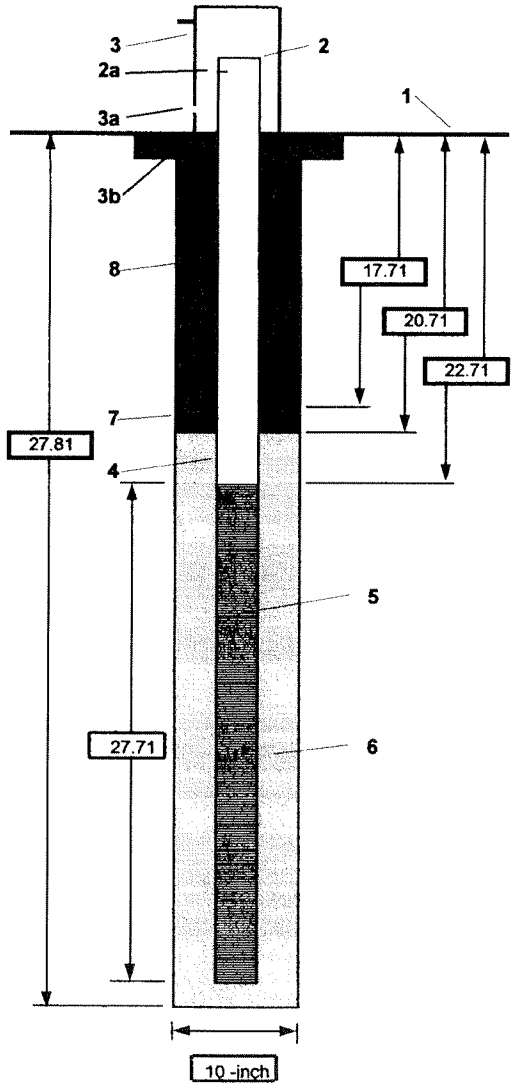
PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : 117.63 TOC
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 12.75 ft btoc
START : 11/10/00 12:55
END : 14:30
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	18/24	SS-2"	3-3-4-5 (7)	Very Pale Brown (10 YR 8/3), dry, loose, medium sand (SP), well-sorted, subangular	Headspace = 17.6 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 88 °F
10	10 to 12	20/24	SS-2"	4-6-10-11 (16)	Top 2", Very Pale Brown (10 YR 8/3) to Gray (10 YR 5/1), damp, medium dense, medium sand (SP), well-sorted, subangular Bottom 18", Very Dark Grayish Brown (10 YR 3/2), damp to wet, medium dense, silty fine to medium sand (SP/SM), fairly well-sorted, subangular	Headspace = 10.0 ppm Background = 0.0 ppm Soil Temperature = 90 °F
15	15 to 17	14/24	SS-2"	3-2-1-2 (3)	Very Dark Grayish Brown (10 YR 3/2), damp to wet, very loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 25.3 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 91 °F
20	20 to 22	24/24	SS-2"	10-13-11-11 (24)	Same as above, but medium dense	Headspace = 6.1 ppm Background = 0.0 ppm Soil Temperature = 91 °F
25	25 to 27	24/24	SS-2"	NR	Same as above, increase in silt content with depth End of Boring at 25.0 ft	Headspace = 19.5 ppm Background = 0.0 ppm Soil Temperature = 92 °F

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-29B	SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 12.75 ft btoc START : 11/10/00 12:55 END : 14:30 LOGGER : Kim-Lee Murphy



1- Ground elevation at well: 115.0

2- Top of casing elevation: 117.63
a) vent hole? No

3- Wellhead protection cover type: 4-inch Steel Sleeve above grade protector
a) weep hole? No
b) concrete pad dimensions: 2-ft by 2-ft

4- Dia./type of well casing: 2-inch diameter PVC

5- Type/slot size of screen: 2-inch diameter PVC, 0.010-inch slot screen

6- Type screen filter: 30/45 Standard Silica Sand
a) Quantity used: 7 50-pound bags

7- Type of seal: Pre-hydrated Bentonite (Kwikgel)
a) Quantity used: 12.5 pounds
30/65 Standard Silica Sand
b) Quantity used: 25 pounds

8- Grout
a) Grout mix used: Holnam 1 Portland Cement with Kwikgel
b) Method of placement: Tremie Pipe
c) Vol. of well casing grout: 5 92.6-pound bags

Development method: Swabbing with Surge Block and Pumping

Development time: 2 hours 14 minutes

Estimated purge volume: 17 gallons

Comments
Northing = 1537906.11
Easting = 549502.66

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-29B	SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DEVELOPMENT CONTRACTOR : Groundwater Protection

DEVELOPMENT METHOD AND EQUIP USED : Swabbing and Pumping; Pump from Dietrich 120 mobile drill rig (centrifugal), tremie pipe and surge block

START WATER LEVELS : 12.77 ft btoc START :11/17/00 09:20 END :11/20/00 10:30 LOGGER : Kim-Lee Murphy

MAXIMUM DRAWDOWN DURING PUMPING: dry

TOTAL QUANTITY OF WATER DISCHARGED: 45 gallons

DISPOSITION OF DISCHARGE WATER: Turbid, H_2S Odor

OVM readings taken above water purging out of well into 55-gallon drum.

****Pump not working efficiently, pulling air. Decided to continue another day.**

Note: Well continuously purging dry. Well pumped dry over 4 times.

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (mS/cm)	Remarks (color, odor, sheen, sediment, etc.)
11/17/00** 9:22	0	15.40	>999	27.1	5.80	0.101	Dark Brown, Salinity = 0.00 OVM = 3.2 ppm, Background = 1.0 ppm
11/20/00 8:41	12	12.94	>999	27.3	5.61	0.323	Sulfur Odor Dark Brown, Salinity = 0.00
9:00	25	No Reading	>999	29.9	6.11	0.242	Sulfur Odor Dark Brown, Salinity = 0.00
10:26	40	No Reading	>999	27.3	6.53	0.252	Sulfur Odor Dark Brown, Salinity = 0.00
10:29	45	No Reading	>999	28.1	6.40	0.244	Sulfur Odor Dark Brown, Salinity = 0.00
10:39	—	19.75	—	—	—	—	

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	BORING NUMBER OLD-36-30C	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando — LOCATION : SA-36

ELEVATION : 117.94 TOC — DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 16.18 ft btoc — START : 11/9/00 15:20 — END : 16:25 — LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
					Boring is located 2 ft Northwest of OLD-36-INJ-06 and 2 ft East of OLD-36-INJ-08. Refer to these soil boring logs for 0 - 20 ft bls stratigraphy	
5						
10						
15						
20						
25	25 to 27	22/24	SS-2"	5-9-15-12+ (24)	Top 16", Brown (10 YR 4/3), damp, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular, mottled in color Bottom 6", Very Dark Grayish Brown (10 YR 3/2), damp, medium dense, silty fine sand (SM), fairly well-sorted, subangular	Headspace = 32.9 ppm Background = 0.0 - 1.1 ppm Breathing zone, Above borehole = 0.5 ppm Soil Temperature = 82 °F

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-30C	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : T117.94 TOC
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 16.18 ft btoc
START : 11/9/00 15:20
END : 16:25
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Headspace
30	30 to 32	23/24	SS-2"	4-5-2-5 (7)	Very Dark Grayish Brown (10 YR 3/2), wet, loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 17.6 ppm Background = 0.0 - 1.1 ppm Soil Temperature = 84 °F
35	35 to 37	22/24	SS-2"	1-2-3-3 (5)	Top 14", Very Dark Grayish Brown (10 YR 3/2), wet, loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular Bottom 8", Light Yellowish Brown (10YR 6/4), wet, loose, silty fine to coarse sand (SP/SM), poorly sorted, subangular End of boring at 35.0 ft	Headspace = 17.6 ppm Background = 0.0 - 1.1 ppm Soil Temperature = 81 °F
40						
45						
50						

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-30C	SHEET 1 OF 1

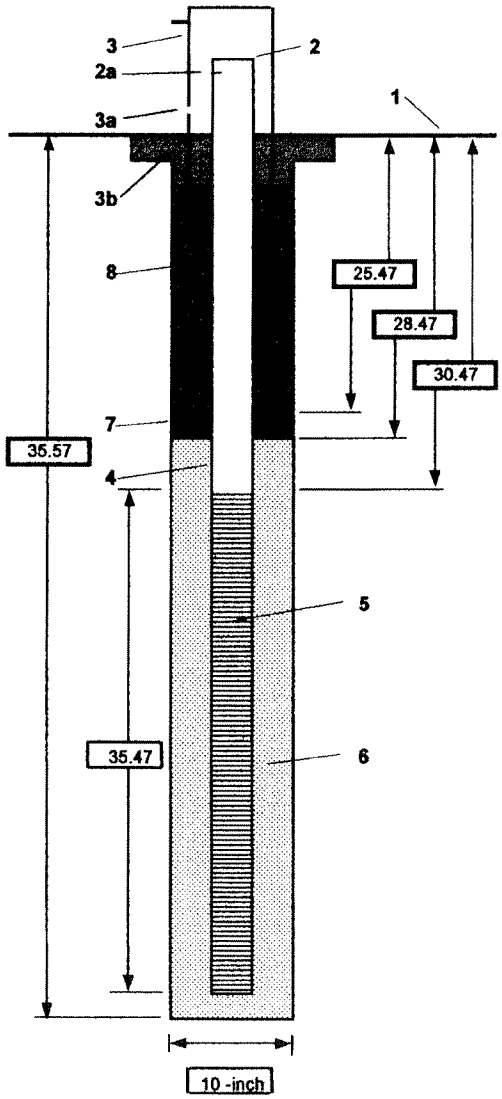
WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 16.18 ft btoc START : 11/9/00 15:20 END : 16:25 LOGGER : Kim-Lee Murphy



1- Ground elevation at well	115.2
2- Top of casing elevation	117.94
a) vent hole?	No
3- Wellhead protection cover type	4-inch Steel Sleeve above grade protector
a) weep hole?	No
b) concrete pad dimensions	2-ft by 2-ft
4- Dia./type of well casing	2-inch diameter PVC
5- Type/slot size of screen	2-inch diameter PVC, 0.010-inch slot screen
6- Type screen filter	30/45 Standard Silica Sand
a) Quantity used	9 50-pound bags
7- Type of seal	Pre-hydrated Bentonite (Kwikgel)
a) Quantity used	25 pounds
	30/65 Standard Silica Sand
b) Quantity used	25 pounds
8- Grout	
a) Grout mix used	Holnam 1 Portland Cement with Kwikgel
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	6 92.6-pound bags
Development method	Swabbing with Surge Block and Pumping
Development time	14 minutes
Estimated purge volume	110 gallons

Comments

Northing = 1537889.96

Easting = 549525.96

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-30C	SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DEVELOPMENT CONTRACTOR : Groundwater Protection

DEVELOPMENT METHOD AND EQUIP USED : Swabbing and Pumping; Pump from Dietrich 120 mobile drill rig (centrifugal), tremie pipe and surge block

START WATER LEVELS : 16.69 ft btoc START : 11/20/00 12:39 END : 13:01 LOGGER : Kim-Lee Murphy

MAXIMUM DRAWDOWN DURING PUMPING: 0.08 ft

TOTAL QUANTITY OF WATER DISCHARGED: 110 gallons

DISPOSITION OF DISCHARGE WATER: Turbid

OVM readings taken above water purging out of well into 55-gallon drum.

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (mS/cm)	Remarks (color, odor, sheen, sediment, etc.)
12:47	0	16.69	>999	25.0	5.23	0.271	Dark Brown, Salinity = 0.00
12:51	25	No Reading	>999	24.9	5.30	0.178	Dark Brown, Salinity = 0.00 OVM = 6.7 ppm, Background = 4.2 ppm
12:53	40	No Reading	>999	25.7	5.44	0.134	Dark Brown, Salinity = 0.00
12:56	70	No Reading	>999	26.0	5.44	0.118	Dark Brown, Salinity = 0.00
12:57	80	No Reading	>999	25.6	5.37	0.112	Dark Brown, Salinity = 0.00
12:59	90	No Reading	>999	26.3	5.39	0.102	Dark Brown, Salinity = 0.00
13:01	110	16.77	>999	25.9	5.38	0.100	Dark Brown, Salinity = 0.00

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-31C	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando — LOCATION : SA-36

ELEVATION : 117.80 TOC — DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 14.59 ft btoc — START : 11/13/00 13:08 — END : 14:30 — LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	10/24	SS-2"	3-3-4-5 (7)	Very Pale Brown (10 YR 8/3), dry, loose, medium sand (SP), well-sorted, subangular	Headspace = 32.9 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 83 °F
10	10 to 12	20/24	SS-2"	3-10-17-10 (27)	Top 16", Very Pale Brown (10 YR 8/3), dry, loose, medium sand (SP), well-sorted, subangular, mottled in color Bottom 8", Very Dark Grayish Brown (10 YR 3/2), wet, medium dense, silty fine sand (SM), fairly well-sorted, subangular	Headspace = 18.8 ppm Background = 0.0 ppm Soil Temperature = 83 °F
15	15 to 17	18/24	SS-2"	4-5-8-6 (13)	Top 10", Very Pale Brown (10 YR 8/3), dry, medium dense, medium sand (SP), well-sorted, subangular, mottled in color Bottom 8", Very Dark Grayish Brown (10 YR 3/2), wet, medium dense, silty fine sand (SM), fairly well-sorted, subangular	Headspace = 30.0 ppm Background = 0.0 ppm Soil Temperature = 85 °F
20	20 to 22	22/24	SS-2"	5-7-10-15 (17)	Dark Grayish Brown (10 YR 4/3), wet, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 14.9 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 85 °F
25	25 to 27	20/24	SS-2"	3-3-2-2 (5)	Dark Grayish Brown (10 YR 4/3), wet, loose, silty fine to medium sand, predominantly medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 15.5 ppm Background = 0.0 ppm Soil Temperature = 83 °F

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-31C	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : 117.80 TOC
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 14.59 ft btoc
START : 11/13/00 13:08
END : 14:30
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Headspace
30	30 to 32	24/24	SS-2"	6-5-7-6 (12)	Top 12", Dark Grayish Brown (10 YR 4/3), wet, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular Bottom 12", Dark Yellowish Brown (10YR 4/4), wet, medium dense, silty fine to medium sand increase in silt content (SP/SM), fairly poorly sorted, subangular	Headspace = 19.0 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 89 °F
35	35 to 37	14/24	SS-2"	NR	Dark Yellowish Brown (10YR 4/4), wet, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	
					End of boring at 35.0 ft	
40						
45						
50						

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-31C	SHEET 1 OF 1

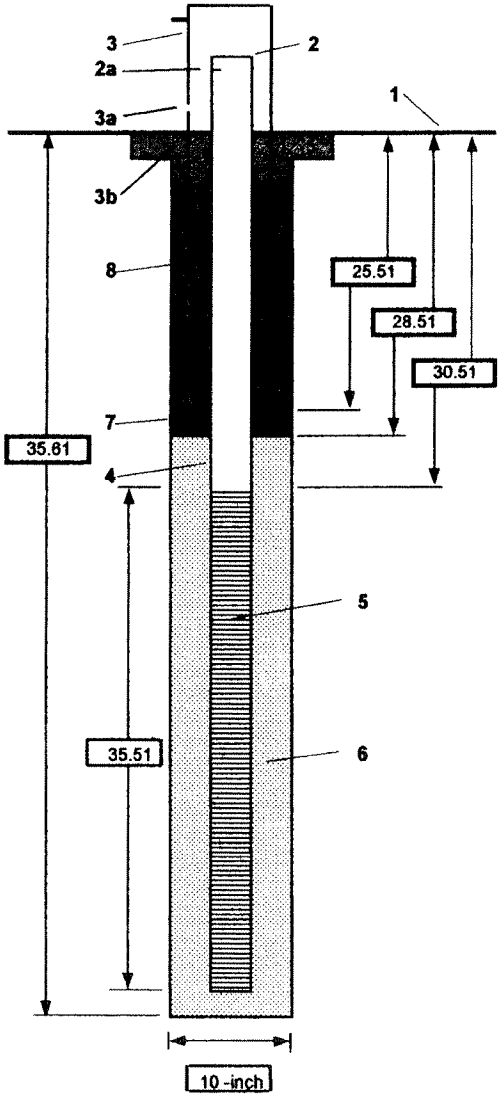
WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 13.81 ft btoc START : 11/14/00 08:30 END : 10:04 LOGGER : Kim-Lee Murphy



1- Ground elevation at well	115.1
2- Top of casing elevation	117.8
a) vent hole?	No
3- Wellhead protection cover type	4-inch Steel Sleeve above grade protector
a) weep hole?	No
b) concrete pad dimensions	2-ft by 2-ft
4- Dia./type of well casing	2-inch diameter PVC
5- Type/slot size of screen	2-inch diameter PVC, 0.010-inch slot screen
6- Type screen filter	30/45 Standard Silica Sand
a) Quantity used	9 50-pound bags
7- Type of seal	Pre-hydrated Bentonite (Kwikgel)
a) Quantity used	25 pounds
	30/65 Standard Silica Sand
b) Quantity used	25 pounds
8- Grout	
a) Grout mix used	Holnam 1 Portland Cement with Kwikgel
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	6 92.6-pound bags
Development method	Swabbing with Surge Block and Pumping
Development time	19 minutes
Estimated purge volume	110 gallons

Comments

Northing = 1537893.95

Easting = 549520.86

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-31C SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT : Naval Training Center, Orlando LOCATION : SA-36
DEVELOPMENT CONTRACTOR : Groundwater Protection
DEVELOPMENT METHOD AND EQUIP USED : Swabbing and Pumping; Pump from Dietrich 120 mobile drill rig (centrifugal), tremie pipe and surge block
START WATER LEVELS : 16.85 ft btoc START : 11/20/00 11:41 END : 12:00 LOGGER : Kim-Lee Murphy

MAXIMUM DRAWDOWN DURING PUMPING: No drawdown noted
TOTAL QUANTITY OF WATER DISCHARGED: 110 gallons
DISPOSITION OF DISCHARGE WATER: Turbid, Sulfur Odor
OVM readings taken above water purging out of well into 55-gallon drum.

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (mS/cm)	Remarks (color, odor, sheen, sediment, etc.)
11:42	0	16.85	>999	25.0	5.23	0.155	Sulfur Odor Dark Brown, Salinity = 0.00
11:48	17	No Reading	>999	26.2	5.22	0.110	Sulfur Odor Dark Brown, Salinity = 0.00
11:50	34	No Reading	>999	25.3	5.39	0.097	Dark Brown, Salinity = 0.00 OVM = 0.0 ppm, Background = 0.0 ppm
11:55	70	No Reading	>999	25.7	5.28	0.086	Sulfur Odor Dark Brown, Salinity = 0.00
11:56	80	No Reading	>999	25.5	5.23	0.085	Sulfur Odor Dark Brown, Salinity = 0.00
11:58	95	No Reading	>999	25.9	5.19	0.081	Sulfur Odor Dark Brown, Salinity = 0.00
12:05	—	16.70	>999	—	—	—	

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	BORING NUMBER OLD-36-32C	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando — LOCATION : SA-36

ELEVATION : 117.97 TOC — DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 13.81 ft btoc — START : 11/14/00 08:30 — END : 10:04 — LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	16/24	SS-2"	3-3-4-5 (7)	Very Pale Brown (10 YR 8/3), dry, loose, medium sand (SP), well-sorted, subangular	Headspace = 17.6 ppm Background = 2.0 ppm Breathing zone, Above borehole = 2.0 ppm Soil Temperature = 74 °F
10	10 to 12	20/24	SS-2"	5-5-8-10 (13)	Top 12", Very Pale Brown (10 YR 8/3), dry, medium dense, medium sand (SP), well-sorted, subangular Bottom 8", Very Dark Grayish Brown (10 YR 3/2), damp, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 35.6 ppm Background = 2.0 ppm Soil Temperature = 78 °F
15	15 to 17	24/24	SS-2"	1-1-1-8 (2)	Top 12", Very Pale Brown (10 YR 8/3), dry, very loose, medium sand (SP), well-sorted, subangular Mid 8", Very Dark Grayish Brown (10 YR 3/2), wet, very loose, silty fine sand, some medium sand (SM), fairly poorly sorted, subangular Bottom 4", Grayish Brown (10 YR 5/2), wet, very loose, silty medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 25.4 ppm Background = 2.0 ppm Breathing zone, Above borehole = 2.0 ppm Soil Temperature = 76 °F
20	20 to 22	24/24	SS-2"	4-10-17-16 (27)	Dark Grayish Brown (10 YR 4/2), wet, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 39.3 ppm Background = 2.0 ppm Soil Temperature = 77 °F
25	25 to 27	24/24	SS-2"	8-25-25+ (50+)	Dark Grayish Brown (10 YR 4/2), wet, very dense, silty fine to medium sand, great increase in silt content in bottom 8" of spoon (SP/SM), fairly poorly sorted, subangular	Headspace = 88.1 ppm Background = 2.0 ppm Soil Temperature =78 °F

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-32C	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando — LOCATION : SA-36

ELEVATION : 117.97 TOC — DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

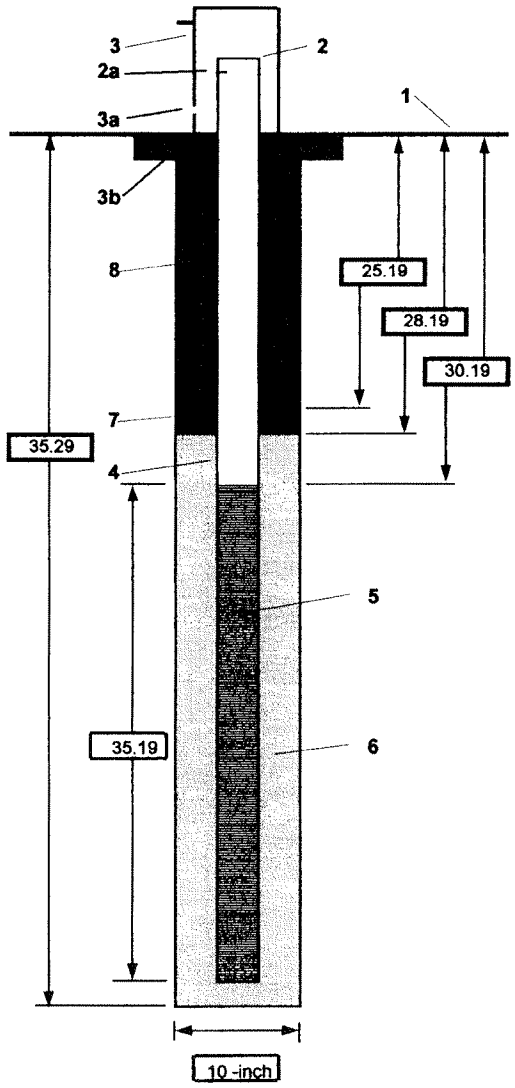
WATER LEVELS : 13.81 ft btoc — START : 11/14/00 08:30 — END : 10:04 — LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Headspace
30	30 to 32	24/24	SS-2"	2-2-4-5 (6)	Brown (10 YR 5/3), wet, loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular, becoming plastic	Headspace = 114.8 ppm Background = 1.0 ppm (Re-calibrated MinieRae PID using Zero Gas Calibration) Soil Temperature = 79 °F
35	35 to 37	24/24	SS-2"	1-1-1-2 (2)	Same as above, but very loose with increase in silt and clay content with depth	Headspace = 57.2 ppm Background = 1.0 ppm Breathing zone, Above borehole = 1.2 ppm Soil Temperature = 75 °F
					End of boring at 35.0 ft	
40						
45						
50						

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-32C	SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 13.81 ft btoc START : 11/14/00 08:30 END : 10:04 LOGGER : Kim-Lee Murphy



1- Ground elevation at well	115.1
2- Top of casing elevation	117.97
a) vent hole?	No
3- Wellhead protection cover type	4-inch Steel Sleeve above grade protector
a) weep hole?	No
b) concrete pad dimensions	2-ft by 2-ft
4- Dia./type of well casing	2-inch diameter PVC
5- Type/slot size of screen	2-inch diameter PVC, 0.010-inch slot screen
6- Type screen filter	30/45 Standard Silica Sand
a) Quantity used	9 50-pound bags
7- Type of seal	Pre-hydrated Bentonite (Kwikgel)
a) Quantity used	25 pounds
	30/65 Standard Silica Sand
b) Quantity used	25 pounds
8- Grout	
a) Grout mix used	Holnam 1 Portland Cement with Kwikgel
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	6 92.6-pound bags
Development method	Swabbing with Surge Block and Pumping
Development time	40 minutes
Estimated purge volume	110 gallons

Comments
Northing = 1537917.64
Easting = 549492.02

CH2MHILL	PROJECT NUMBER 152044.32.12.01.08	WELL NUMBER OLD-36-32C SHEET 1 OF 1

WELL DEVELOPMENT LOG

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DEVELOPMENT CONTRACTOR : Groundwater Protection

DEVELOPMENT METHOD AND EQUIP USED : Swabbing and Pumping; Pump from Dietrich 120 mobile drill rig (centrifugal), tremie pipe and surge block

START WATER LEVELS : 16.50 ft btoc START : 11/20/00 08:26 END : 09:06 LOGGER : Kim-Lee Murphy

MAXIMUM DRAWDOWN DURING PUMPING: 0.12 ft

TOTAL QUANTITY OF WATER DISCHARGED: 110 gallons

DISPOSITION OF DISCHARGE WATER: Turbid

OVM readings taken above water purging out of well into 55-gallon drum.

Time	Water Volume Discharged (gal)	Water Level (ft BTOC)	Turbidity (NTU)	Temperature (°C)	pH	Conductivity (mS/cm)	Remarks (color, odor, sheen, sediment, etc.)
8:27	0	16.50	931	26.4	5.65	0.101	Dark Brown, Salinity = 0.00 OVM =5.5 ppm, Background =4.7 ppm
8:34	25	No Reading	>999	26.6	5.59	0.137	Dark Brown, Salinity = 0.00
8:36	34	No Reading	>999	26.9	5.51	0.119	Dark Brown, Salinity = 0.00 OVM = 0.0 ppm, Background = 0.0 ppm
8:57	55	No Reading	>999	28.3	5.60	0.114	Dark Brown, Salinity = 0.00
8:59	65	No Reading	>999	27.2	5.54	0.103	Dark Brown, Salinity = 0.00 OVM = 4.7 ppm, Background = 3.5 ppm
9:03	80	No Reading	>999	27.1	5.45	0.098	Dark Brown, Salinity = 0.00
9:04	90	No Reading	>999	27.3	5.45	0.094	Dark Brown, Salinity = 0.00
9:05	100	No Reading	>999	27.4	5.44	0.095	Dark Brown, Salinity = 0.00
9:06	110	16.62	>999	27.2	5.43	0.095	Dark Brown, Salinity = 0.00

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-39-33A	SHEET 1 OF 1

CH2MHILL

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : To Be Determined
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 12.58 ft btoc
START : 11/14/00 14:40
END : 15:20
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	16/24	SS-2"	4-4-5-4 (9)	Top 9", White (10 YR 8/1), dry, loose, medium sand (SP), well-sorted, subangular Bottom 7", Dark Yellowish Brown (10 YR 4/6), dry, loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 17.0 ppm Background = 0.0 ppm Soil Temperature = 80 °F
10	10 to 12	18/24	SS-2"	8-11-12-20+ (22)	Top 6", White (10 YR 8/1) to Gray (10 YR 5/1), damp, medium dense, medium sand (SP), well-sorted, subangular Mid 1", Limestone Ash Bottom 11", Very Dark Grayish Brown (10 YR 3/2), damp, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular, distinct sulfur odor	Headspace = 65.1 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 83 °F
15	15 to 17	24/24	SS-2"	4-6-13-14 (19)	Very Dark Grayish Brown (10 YR 3/2), damp, medium dense, silty fine to medium sand, increase in medium sand content with depth (SP/SM), fairly well-sorted, subangular, distinct sulfur odor End of Boring at 18.0 ft	Headspace = 0.0 ppm Background = 0.0 ppm Soil Temperature = 81 °F
20						
25						

PROJECT NUMBER	WELL NUMBER	
152044.32.12.01.08	OLD-36-33A	SHEET 1 OF 1

CH2MHILL

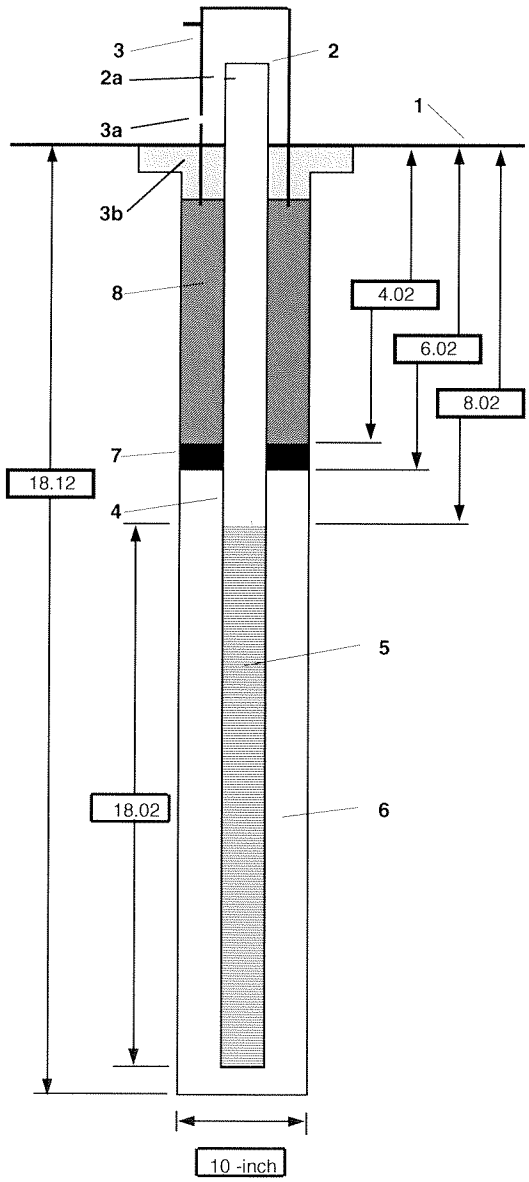
WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 12.58 ft btoc START : 11/14/00 14:40 END : 15:20 LOGGER : Kim-Lee Murphy



1- Ground elevation at well	To Be Determined
2- Top of casing elevation	To Be Determined
a) vent hole?	No
3- Wellhead protection cover type	4-inch Steel Sleeve above grade protector
a) weep hole?	No
b) concrete pad dimensions	2-ft by 2-ft
4- Dia./type of well casing	2-inch diameter PVC
5- Type/slot size of screen	2-inch diameter PVC, 0.006-inch slot screen
6- Type screen filter	30/65 Standard Silica Sand
a) Quantity used	8 50-pound bags
7- Type of seal	30/65 Standard Silica Sand
a) Quantity used	50 pounds
8- Grout	
a) Grout mix used	Holnam 1 Portland Cement with Kwikgel
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	4 92.6-pound bags
Development method	Swabbing with Surge Block and Pumping
Development time	23 minutes
Estimated purge volume	110 gallons

Comments

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-34B	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : To Be Determined
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 13.15 ft btoc
START : 11/14/00 13:35
END : 14:15
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5					**Boring is located 2 ft West of OLD-36-35C Refer to OLD-36-35C boring log for stratigraphy, soil temperature, and OVM readings.**	
10						
15						
20						
25					End of Boring at 25.0 ft	

PROJECT NUMBER	WELL NUMBER	
152044.32.12.01.08	OLD-36-34B	SHEET 1 OF 1

CH2MHILL

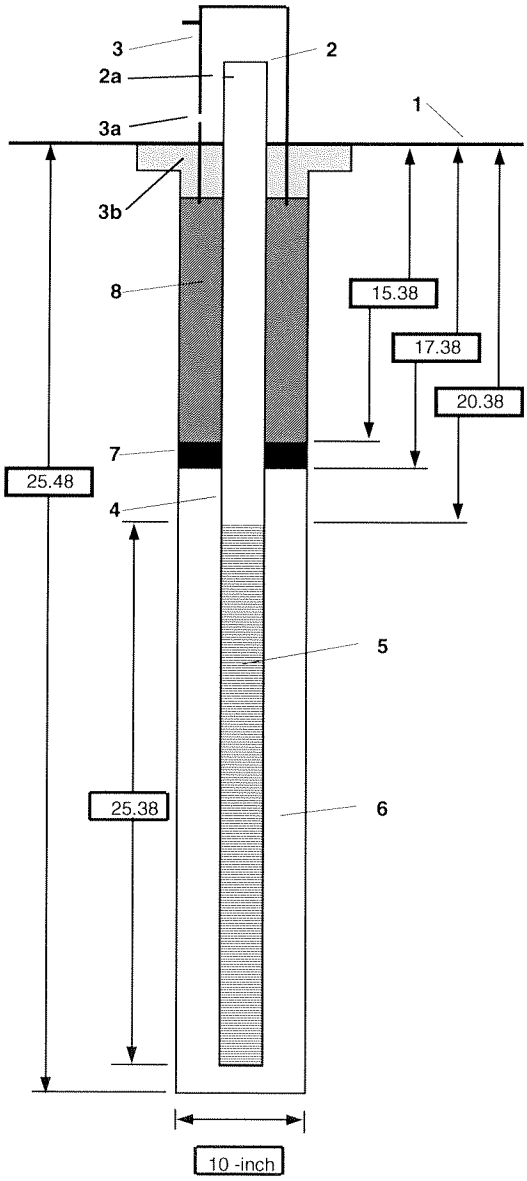
WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 13.15 ft btoc START : 11/14/00 13:35 END : 14:15 LOGGER : Kim-Lee Murphy



1- Ground elevation at well	To Be Determined
2- Top of casing elevation	To Be Determined
a) vent hole?	No
3- Wellhead protection cover type	4-inch Steel Sleeve above grade protector
a) weep hole?	No
b) concrete pad dimensions	2-ft by 2-ft
4- Dia./type of well casing	2-inch diameter PVC
5- Type/slot size of screen	2-inch diameter PVC, 0.006-inch slot screen
6- Type screen filter	30/65 Standard Silica Sand
a) Quantity used	7.5 50-pound bags
7- Type of seal	Pre-hydrated Bentonite (Kwikgel)
a) Quantity used	12.5 pounds
8- Grout	
a) Grout mix used	Holnam 1 Portland Cement with Kwikgel
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	5 92.6-pound bags
Development method	Swabbing with Surge Block and Pumping
Development time	13 minutes
Estimated purge volume	110 gallons

Comments

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-35C	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : To Be Determined
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 14.77 ft btoc START : 11/14/00 10:30 END : 12:50 LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	18/24	SS-2"	3-5-5-6 (10)	Top 2", White (10 YR 8/1), dry, loose, medium sand (SP), well-sorted, subangular Bottom 16", Dark Yellowish Brown (10 YR 3/4), dry, loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 38.8 ppm Background = 2.5 ppm Breathing zone, Above borehole = 2.5 ppm Soil Temperature = 77 °F
10	10 to 12	16/24	SS-2"	4-4-8-13 (12)	Top 8", White (10 YR 8/1), dry, medium dense, medium sand (SP), well-sorted, subangular, mottled in color Bottom 8", Very Dark Grayish Brown (10 YR 3/2), damp to wet, medium dense, silty fine sand with some medium sand (SM), fairly poorly sorted, subangular	Headspace = 31.6 ppm Background = 2.5 ppm Breathing zone, Above borehole = 2.5 ppm Soil Temperature = 75 °F
15	15 to 17	16/24	SS-2"	5-7-10-17 (17)	Top 8", White (10 YR 8/1), dry, medium dense, medium sand (SP), well-sorted, subangular, mottled in color Bottom 8", Very Dark Brown (10 YR 2/2), damp, medium dense, silty fine sand (SM), fairly well-sorted, subangular	Headspace = 60.1 ppm Background = 9.0 ppm** Soil Temperature = 73 °F
20	20 to 22	18/24	SS-2"	3-6-6-7 (12)	Top 12", Very Dark Brown (10 YR 2/2), damp, medium dense, silty fine sand (SM), fairly well-sorted, subangular Bottom 9", Dark Grayish Brown (10 YR 4/2), wet, medium dense, silty fine to medium sand, predominantly medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 66.5 ppm Background = 9.0 ppm** Soil Temperature = 75 °F
25	25 to 27	18/24	SS-2"	9-13-11-16 (24)	Dark Grayish Brown (10 YR 4/2), wet, medium dense, silty fine to medium sand, predominantly medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 43.1 ppm Background = 9.0 ppm** Soil Temperature = 75 °F

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-35C	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : To Be Determined
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 14.77 ft btoc
START : 11/14/00 10:30
END : 12:50
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Headspace
30	30 to 32	24/24	SS-2"	8-12-14-22 (26)	Top 22.5", Dark Grayish Brown (10 YR 4/2), wet, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular Bottom 1.5", Brown (10YR 5/3), wet, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 38.0 ppm Background = 9.0 ppm** Soil Temperature = 75 °F
35	35 to 37	24/24	SS-2"	NR	Dark Grayish Brown (10 YR 4/2), wet, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 195.1 ppm Background = 9.0 ppm** Soil Temperature = 75 °F
					End of boring at 35.0 ft	
40						**Began to rain. PID measuring higher readings due to difficulty to work under moist/wet conditions.
45						
50						

PROJECT NUMBER	WELL NUMBER	
152044.32.12.01.08	OLD-36-35C	SHEET 1 OF 1

CH2MHILL

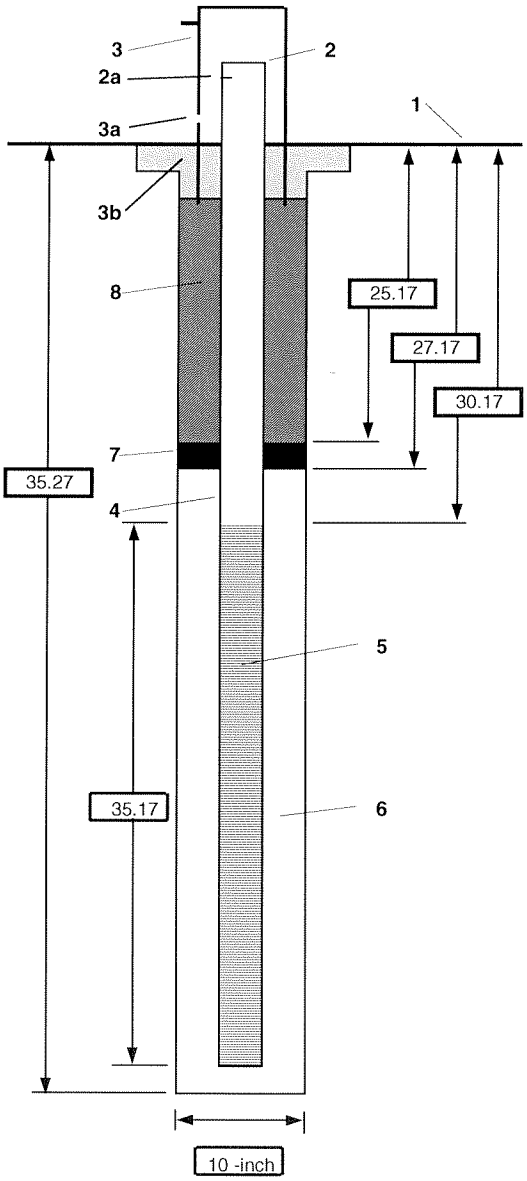
WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 14.77 ft btoc START : 11/14/00 10:30 END : 12:50 LOGGER : Kim-Lee Murphy



1- Ground elevation at well	To Be Determined
2- Top of casing elevation	To Be Determined
a) vent hole?	No
3- Wellhead protection cover type	4-inch Steel Sleeve above grade protector
a) weep hole?	No
b) concrete pad dimensions	2-ft by 2-ft
4- Dia./type of well casing	2-inch diameter PVC
5- Type/slot size of screen	2-inch diameter PVC, 0.006-inch slot screen
6- Type screen filter	30/65 Standard Silica Sand
a) Quantity used	9.5 50-pound bags
7- Type of seal	Pre-hydrated Bentonite (Kwikgel)
a) Quantity used	25 pounds
8- Grout	
a) Grout mix used	Holnam 1 Portland Cement with Kwikgel
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	6 92.6-pound bags
Development method	Swabbing with Surge Block and Pumping
Development time	52 minutes
Estimated purge volume	11 gallons

Comments

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-36C	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : To Be Determined
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS :17.92 ft btoc
START : 11/15/00 07:40
END : 09:42
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	24/24	SS-2"	4-6-6-8 (12)	White (10 YR 8/1), dry, medium dense, medium sand (SP), well-sorted, subangular	Headspace = 153.4 ppm Background = 0.9 ppm Soil Temperature = 60 °F
10	10 to 12	18/24	SS-2"	4-8-12-12 (20)	Top 9", White (10 YR 8/1), dry, medium dense, medium sand (SP), well-sorted, subangular Bottom 9", Very Dark Grayish Brown (10 YR 3/2), damp, medium dense, silty fine sand (SM), fairly well-sorted, subangular	Headspace = 75.3 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 62 °F
15	15 to 17	17/24	SS-2"	3-4-9-8 (13)	Dark Grayish Brown (10 YR 4/2), wet, medium dense, silty fine to medium sand, predominantly medium sand (SP/SM), fairly poorly sorted, subangular	Headspace = 65.3 ppm Background = 0.0 ppm Soil Temperature = 65 °F
20	20 to 22	22/24	SS-2"	4-5-15-12 (20)	Same as above	Headspace = 56.8 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 71 °F
25	25 to 27	24/24	SS-2"	7-5-6-17 (11)	Same as above, increase in silt content and deepening of color with depth, limestone ash present	Headspace = 13.5 ppm Background = 0.0 ppm Soil Temperature = 70 °F

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-36C	SHEET 2 OF 2

CH2MHILL

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : To Be Determined
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS :17.92 ft btoc
START : 11/15/00 07:40
END : 09:42
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Breathing Zone Headspace
30	30 to 32	24/24	SS-2"	10-13-13-14 (26)	Top 17", Dark Grayish Brown (10 YR 4/2), wet, medium dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular Bottom 7", Dark Yellowish Brown (10YR 4/6), wet, medium dense, silty fine to medium sand increase in silt content (SP/SM), fairly poorly sorted, subangular	Headspace = 44.8 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 75 °F
35	35 to 37	21/24	SS-2"	1-2-2-1 (4)	Dark Grayish Brown (10 YR 4/2), wet, very loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular	Headspace =148.2 ppm Background = 0.0 ppm Soil Temperature = 75 °F
					End of boring at 35.0 ft	
40						
45						
50						

PROJECT NUMBER	WELL NUMBER	
152044.32.12.01.08	OLD-36-36C	SHEET 1 OF 1

CH2MHILL

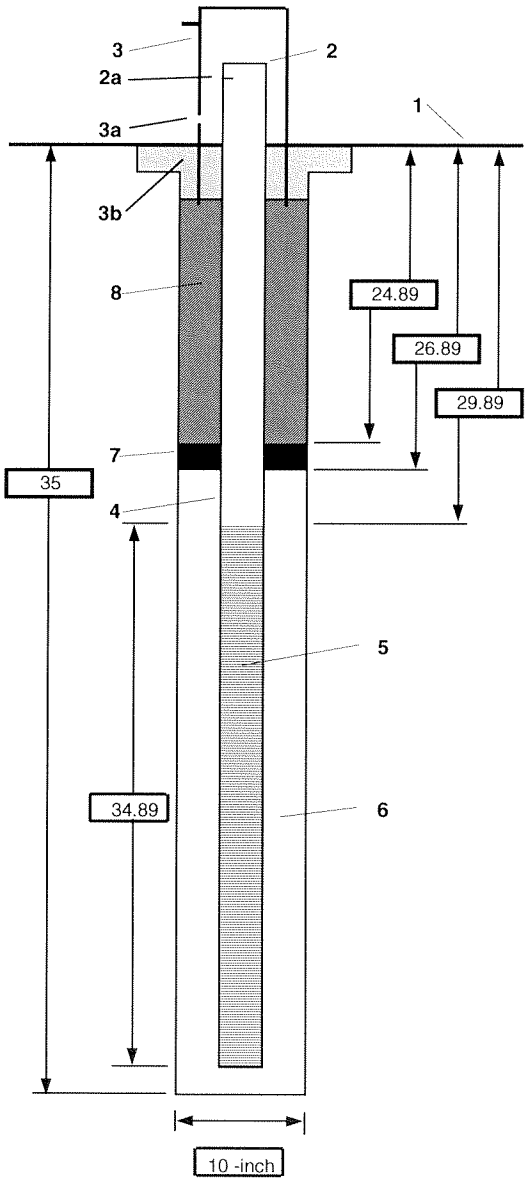
WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DRILLING CONTRACTOR : Groundwater Protection

DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 17.92 ft btoc START : 11/15/00 07:40 END : 09:42 LOGGER : Kim-Lee Murphy



1- Ground elevation at well	To Be Determined
2- Top of casing elevation	To Be Determined
a) vent hole?	No
3- Wellhead protection cover type	4-inch Steel Sleeve above grade protector
a) weep hole?	No
b) concrete pad dimensions	2-ft by 2-ft
4- Dia./type of well casing	2-inch diameter PVC
5- Type/slot size of screen	2-inch diameter PVC, 0.006-inch slot screen
6- Type screen filter	30/65 Standard Silica Sand
a) Quantity used	9.5 50-pound bags
7- Type of seal	Pre-hydrated Bentonite (Kwikgel)
a) Quantity used	25 pounds
8- Grout	
a) Grout mix used	Holnam 1 Portland Cement with Kwikgel
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	6 92.6-pound bags
Development method	Swabbing with Surge Block and Pumping
Development time	26 minutes
Estimated purge volume	110 gallons

Comments

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-37C	SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : To Be Determined
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 13.72 ft btoc
START : 11/9/00 1340
END : 15:15
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
5	5 to 7	12/24	SS-2"	2-2-3-3 (5)	Light Brownish Gray (10 YR 6/2), dry, loose, medium sand (SP), well-sorted, subangular	Headspace = 15.4 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.0 ppm Soil Temperature = 87 °F
10	10 to 12	18/24	SS-2"	5-4-4-9 (8)	Dark Grayish Brown (10 YR 4/2), damp, loose, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular, limestone ash present	Headspace = 1222 ppm Background = 0.0 ppm Soil Temperature = 85 °F
15	15 to 17	15/24	SS-2"	5-7-8-8 (15)	Same as above, but medium dense	Headspace = 1656 ppm Background = 0.0 ppm Breathing zone, Above borehole = 2.0 ppm Soil Temperature = 87 °F
20	20 to 22	24/24	SS-2"	15-18-16-17 (34)	Same as above, but dense and wet	Headspace = 280 ppm Background = 0.0 ppm Soil Temperature = 85 °F
25	25 to 27	24/24	SS-2"	4-22-25-25 (47)	Same as above	Headspace = 83.8 ppm Background = 0.0 ppm Soil Temperature = 84 °F

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
152044.32.12.01.08	OLD-36-37C	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Naval Training Center, Orlando
LOCATION : SA-36
ELEVATION : To Be Determined
DRILLING CONTRACTOR : Groundwater Protection
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler
WATER LEVELS : 13.72 ft btoc
START : 11/9/00 1340
END : 15:15
LOGGER : Kim-Lee Murphy

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): Headspace Analysis
30	30 to 32	20/24	SS-2"	10-17-17-13 (34)	Top 3", Dark Grayish Brown (10 YR 4/3), wet, dense, silty fine to medium sand (SP/SM), fairly poorly sorted, subangular Bottom 17", Pale Brown (10YR 6/3), wet, dense, silty fine sand, some medium sand (SM), fairly poorly sorted, subangular	Headspace = 108.9 ppm Background = 0.0 ppm Breathing zone, Above borehole = 0.2 ppm Soil Temperature = 87 °F
35	35 to 37	24/24	SS-2"	8-8-7-9 (15)	Brown (10 YR 5/3), wet, medium dense, silty fine sand with some medium sand and clay (SM), fairly poorly sorted, plastic, subangular	Headspace =146.9 ppm Background = 0.0 ppm Soil Temperature = 84 °F
					End of boring at 35.0 ft	
40						
45						
50						

PROJECT NUMBER	WELL NUMBER	
152044.32.12.01.08	OLD-36-37C	SHEET 1 OF 1

CH2MHILL

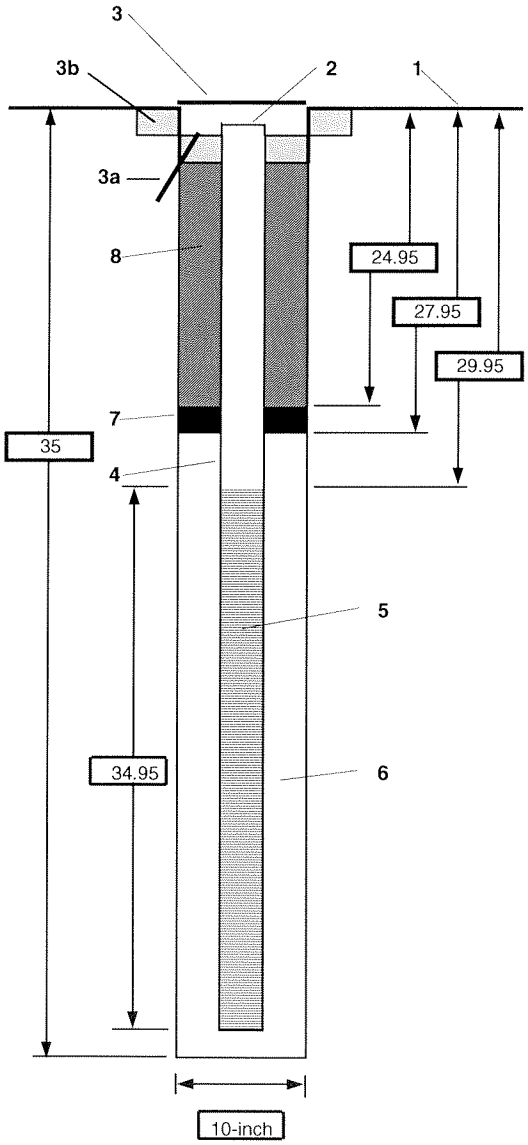
WELL COMPLETION DIAGRAM

PROJECT : Naval Training Center, Orlando LOCATION : SA-36

DRILLING CONTRACTOR : Groundwater Protection

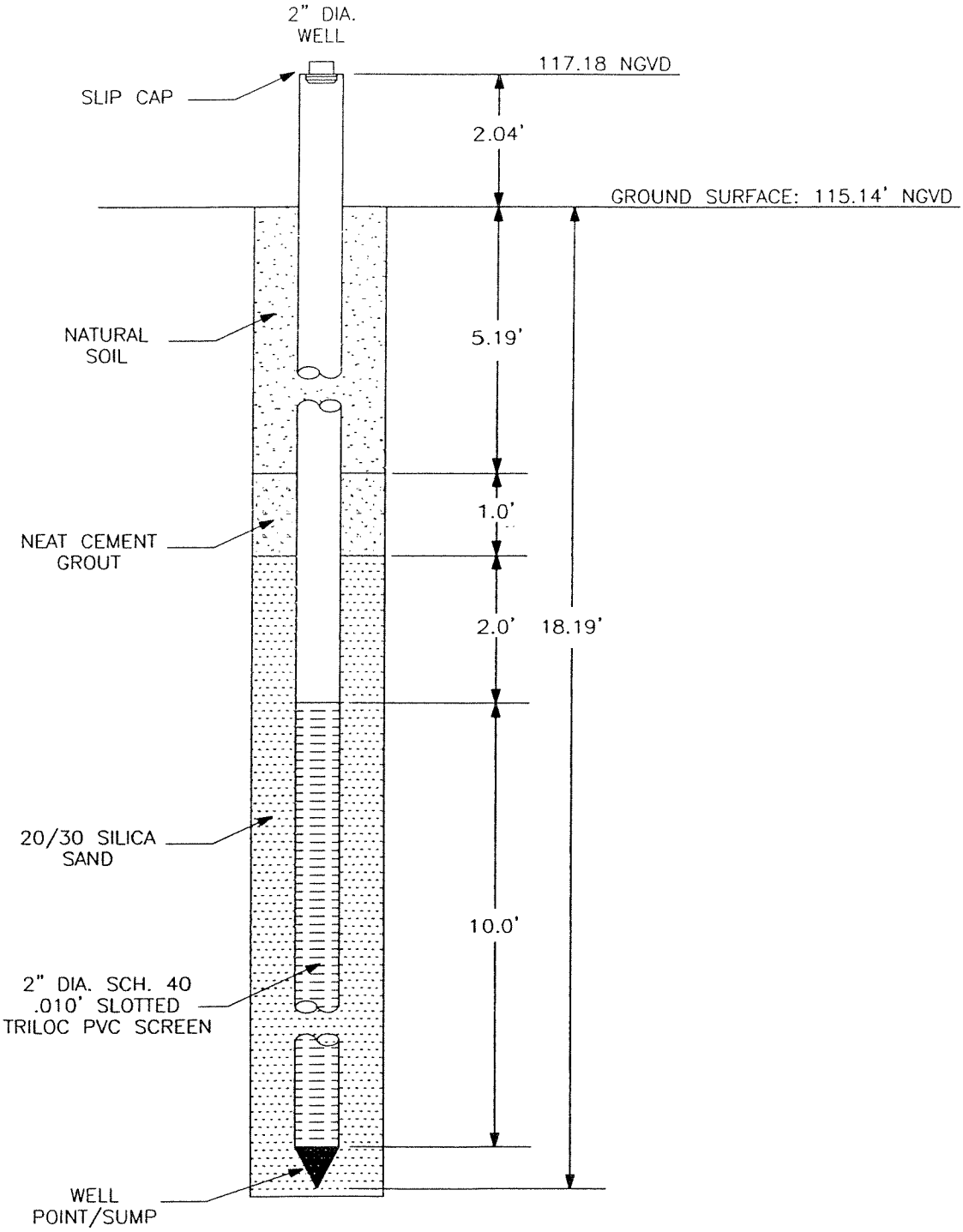
DRILLING METHOD AND EQUIPMENT USED : HSA with Dietrich 120 mobile rig, Manual hammer, Split barrel spoon sampler

WATER LEVELS : 13.72 ft btoc START : 11/9/00 13:40 END : 15:15 LOGGER : Kim-Lee Murphy



1- Ground elevation at well	To Be Determined
2- Top of casing elevation	To Be Determined
3- Wellhead protection cover type	Flushmount manhole cover
a) drain tube?	No
b) concrete pad dimensions	2-ft by 2-ft
4- Dia./type of well casing	2-inch diameter PVC
5- Type/slot size of screen	2-inch diameter PVC, 0.010-inch slot screen
6- Type screen filter	30/45 Standard Silica Sand
a) Quantity used	9 50-pound bags
7- Type of seal	Pre-hydrated Bentonite (Kwikgel)
a) Quantity used	25 pounds
	30/65 Standard Silica Sand
b) Quantity used	25 pounds
8- Grout	
a) Grout mix used	Holnam 1 Portland Cement with Kwikgel
b) Method of placement	Tremie Pipe
c) Vol. of well casing grout	6 92.6-pound bags
Development method	Swabbing with Surge Block and Pumping
Development time	49 minutes
Estimated purge volume	100 gallons

Comments



WELL No. OLD 36-01AR

INSTALLATION REPORT

INSTALLATION DATE: 4-20-02

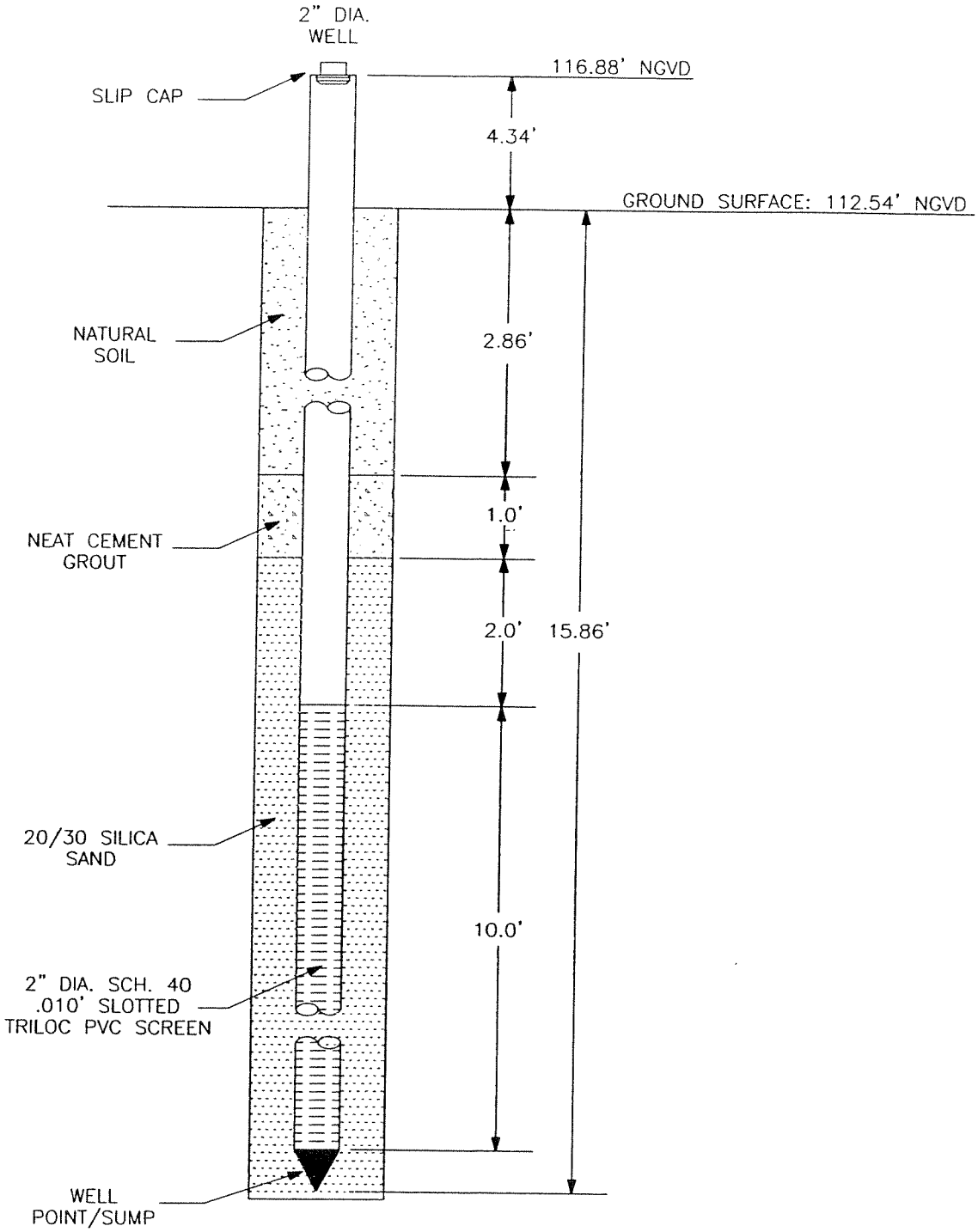
INSTALLED BY: NODARSE & ASSOCIATES, INC.

INSTALLATION METHOD: HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN:	MG
CHKD:	LW
SCALE:	N.T.S.
DATE:	7-18-02
PROJ. NO:	W99-E-186-2
DETAIL:	5

NODARSE & ASSOCIATES, INC.



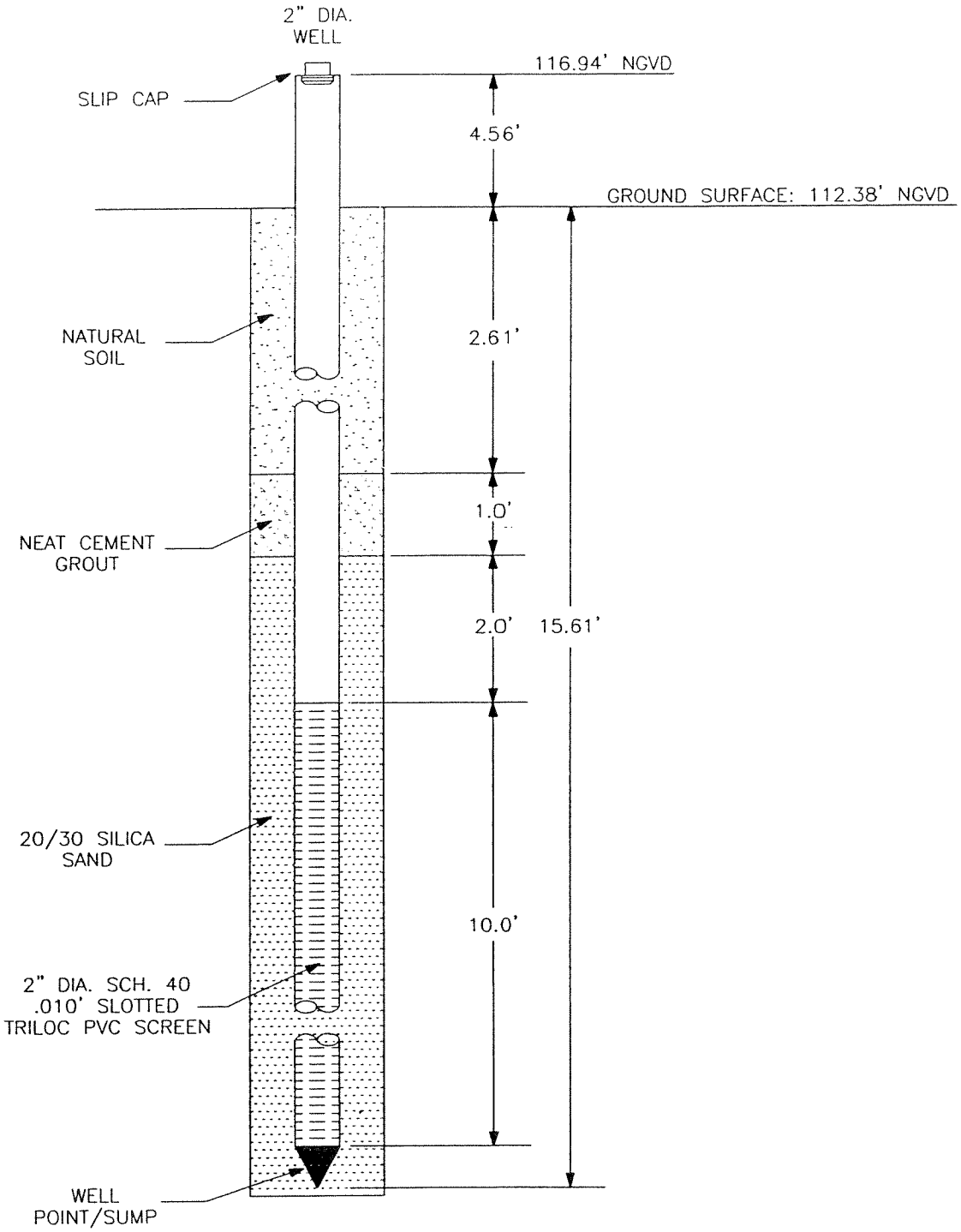
WELL No. OLD 36-02AR

INSTALLATION REPORT

INSTALLATION DATE:	4-29-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 1



WELL No. OLD 36-07AR

INSTALLATION REPORT

INSTALLATION DATE: 5-24-02

INSTALLED BY: NODARSE & ASSOCIATES, INC.

INSTALLATION METHOD: HOLLOW STEM

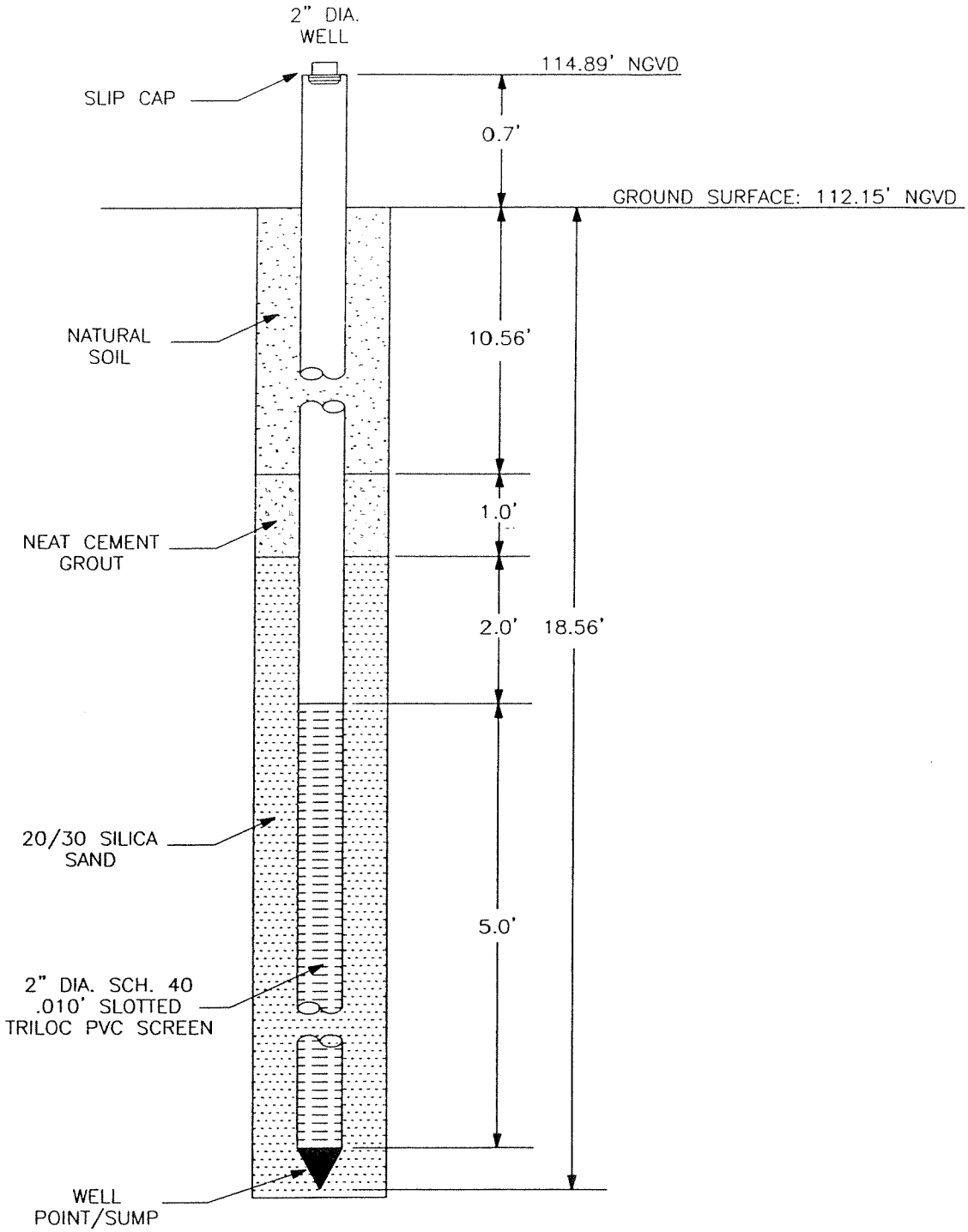
WELL CONSTRUCTION DETAIL

BALDWIN PARK

AREA 36

ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.
CHKD: LW	
SCALE: N.T.S.	
DATE: 7-18-02	PROJ. NO: W99-E-186-2 / DETAIL: 9



WELL No. OLD 36-08BR

INSTALLATION REPORT

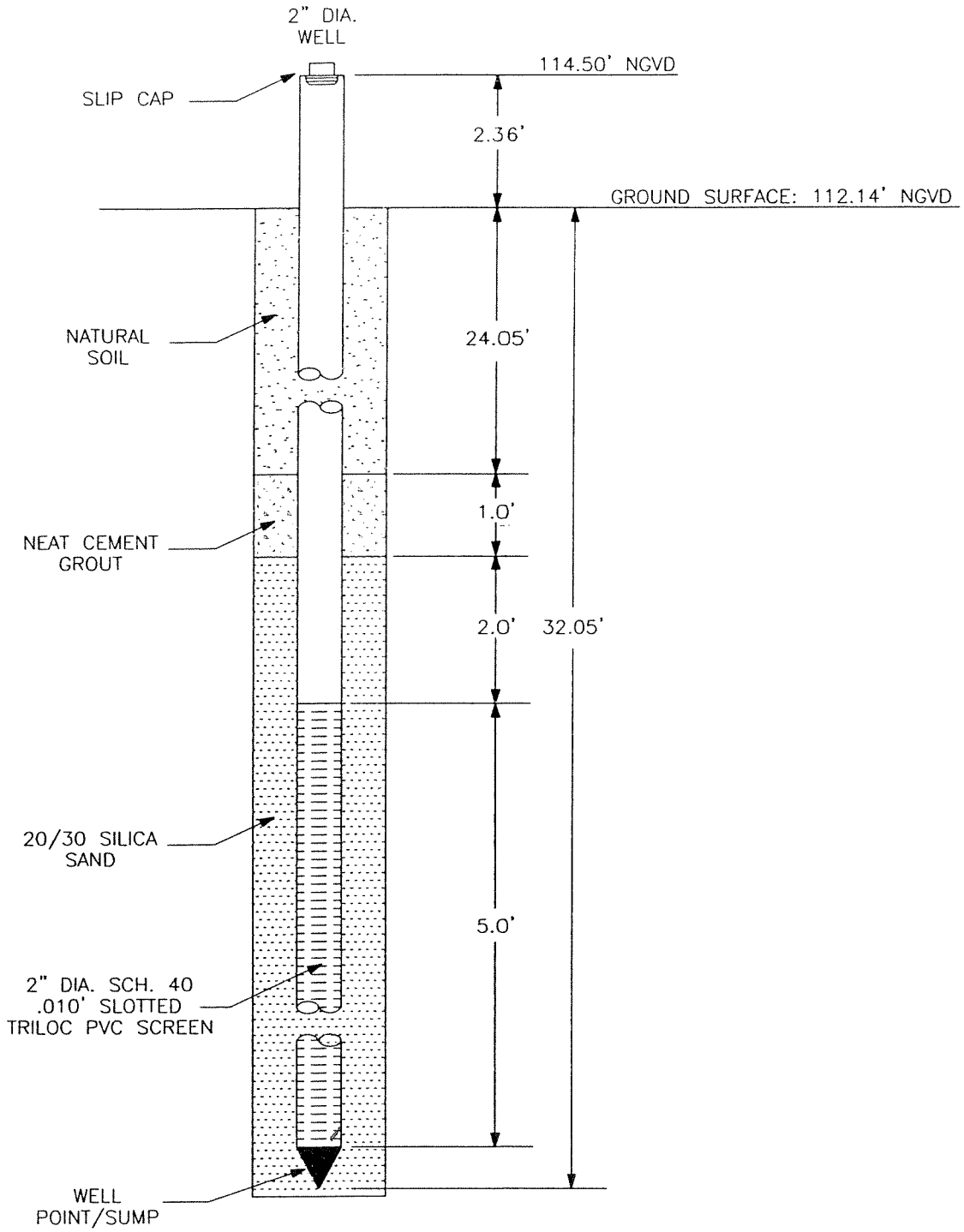
INSTALLATION DATE: 5-24-02

INSTALLED BY: NODARSE & ASSOCIATES, INC.

INSTALLATION METHOD: HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 10



WELL No. OLD 36-09CR

INSTALLATION REPORT

INSTALLATION DATE: 5-28-02

INSTALLED BY: NODARSE & ASSOCIATES, INC.

INSTALLATION METHOD: HOLLOW STEM

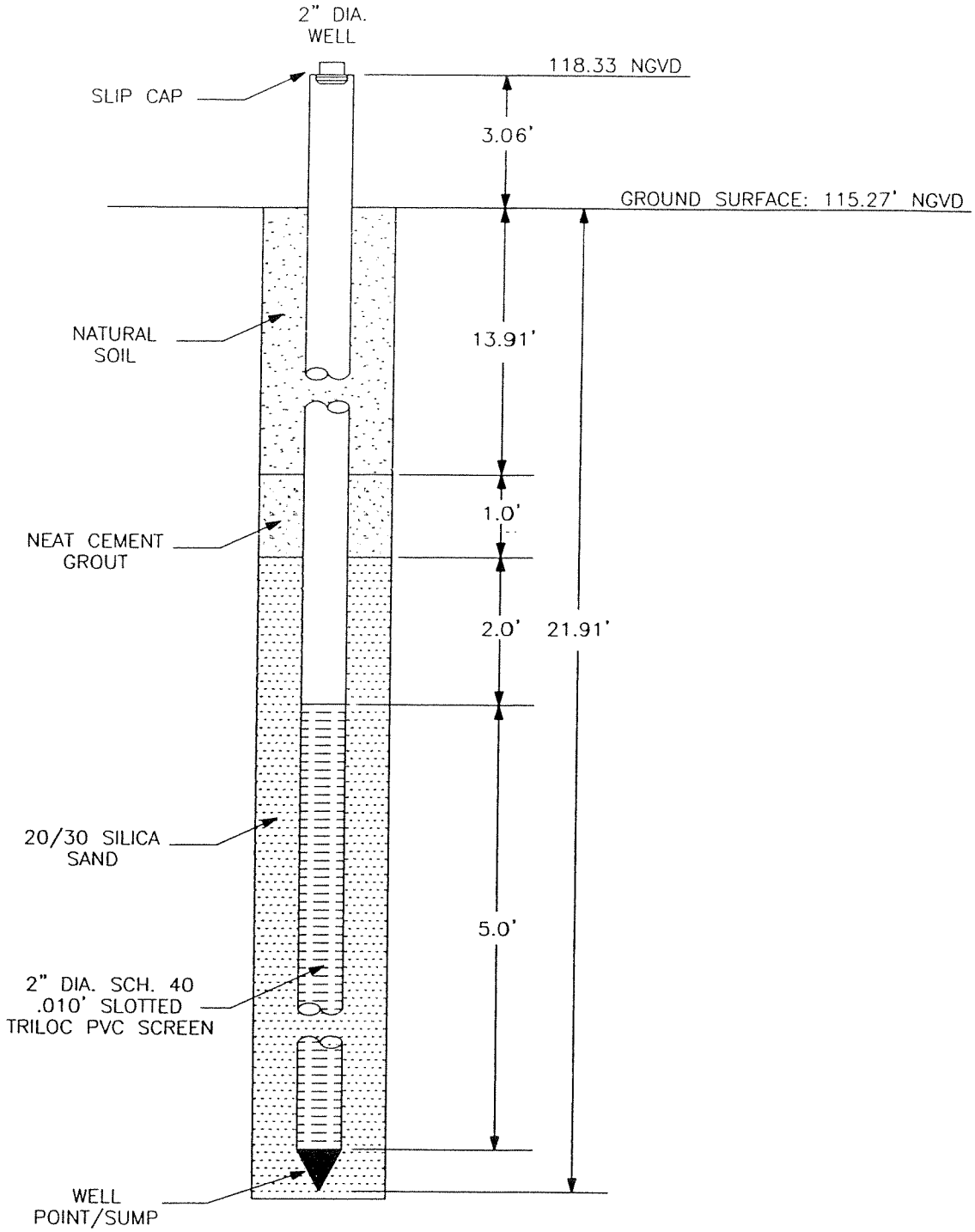
WELL CONSTRUCTION DETAIL

BALDWIN PARK

AREA 36

ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.
CHKD: LW	
SCALE: N.T.S.	
DATE: 7-18-02	PROJ. NO: W99-E-186-2 / DETAIL: 11



WELL No. OLD 36-10BR

INSTALLATION REPORT

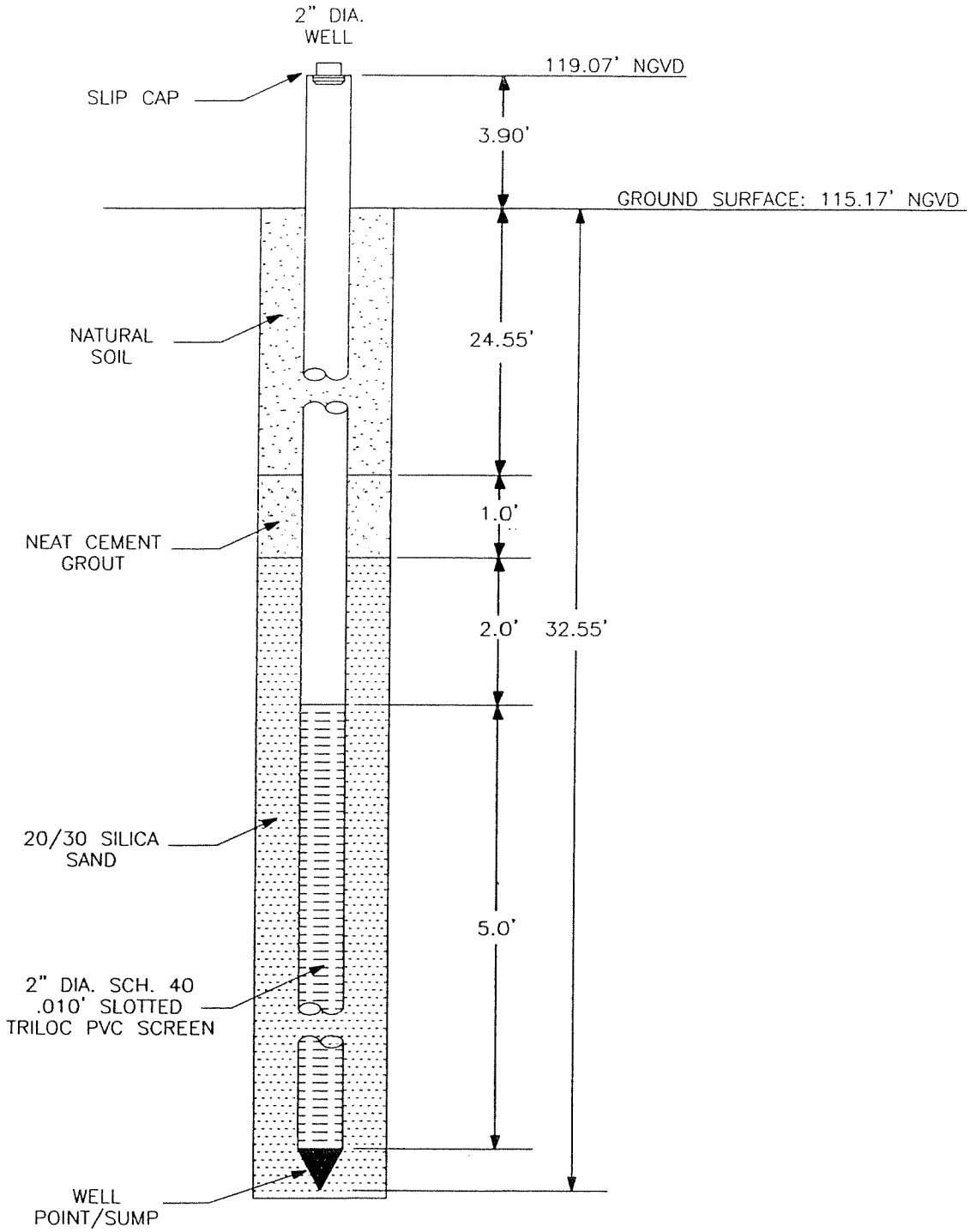
INSTALLATION DATE: 4-20-02

INSTALLED BY: NODARSE & ASSOCIATES, INC.

INSTALLATION METHOD: HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.
CHKD: LW	
SCALE: N.T.S.	
DATE: 7-18-02	PROJ. NO: W99-E-186-2 / DETAIL: 4



WELL No. OLD 36-11CR

INSTALLATION REPORT

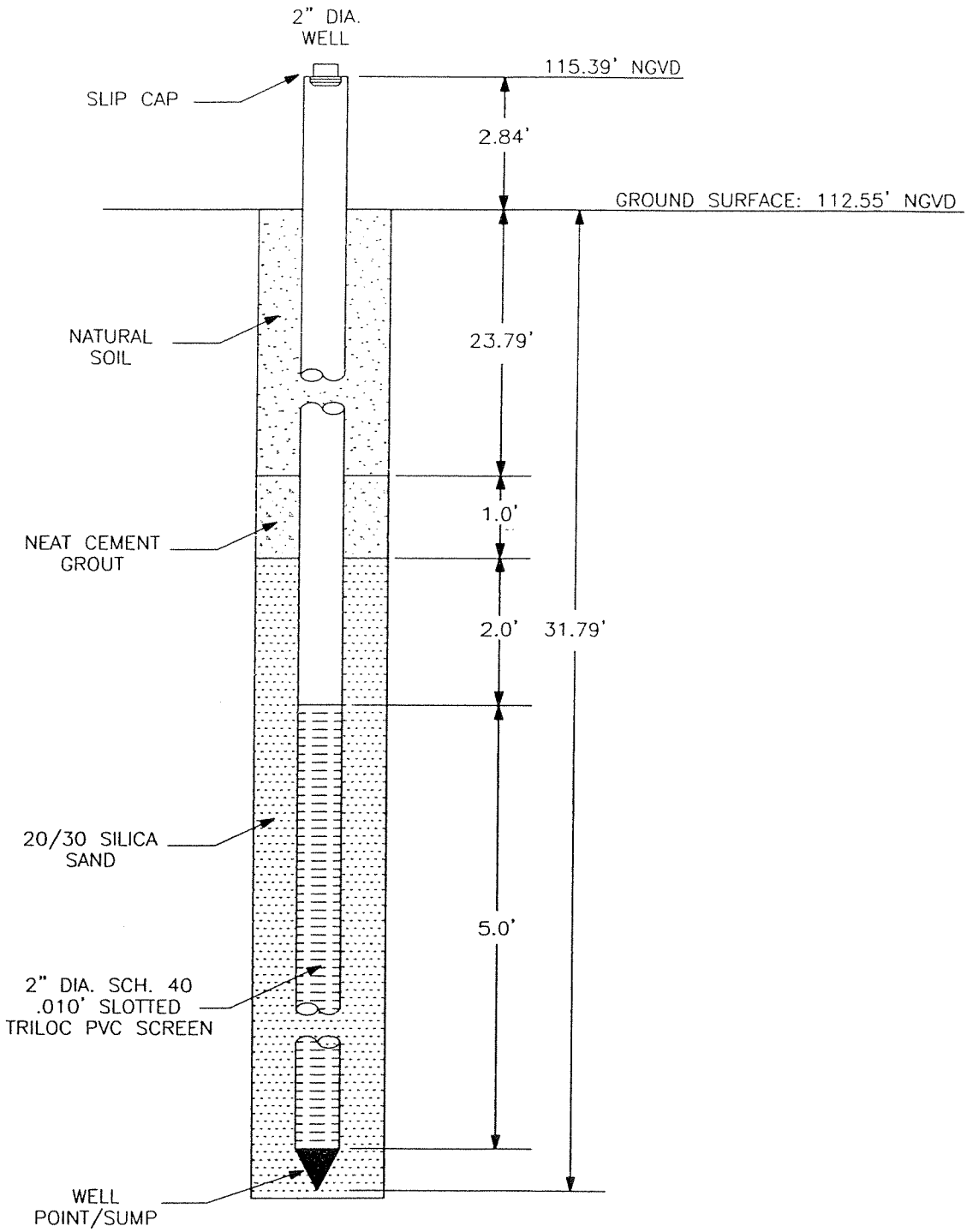
INSTALLATION DATE: 5-22-02

INSTALLED BY: NODARSE & ASSOCIATES, INC.

INSTALLATION METHOD: HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 6



WELL No. OLD 36-18CR

INSTALLATION REPORT

INSTALLATION DATE: 5-29-02

INSTALLED BY: NODARSE & ASSOCIATES, INC.

INSTALLATION METHOD: HOLLOW STEM

WELL CONSTRUCTION DETAIL

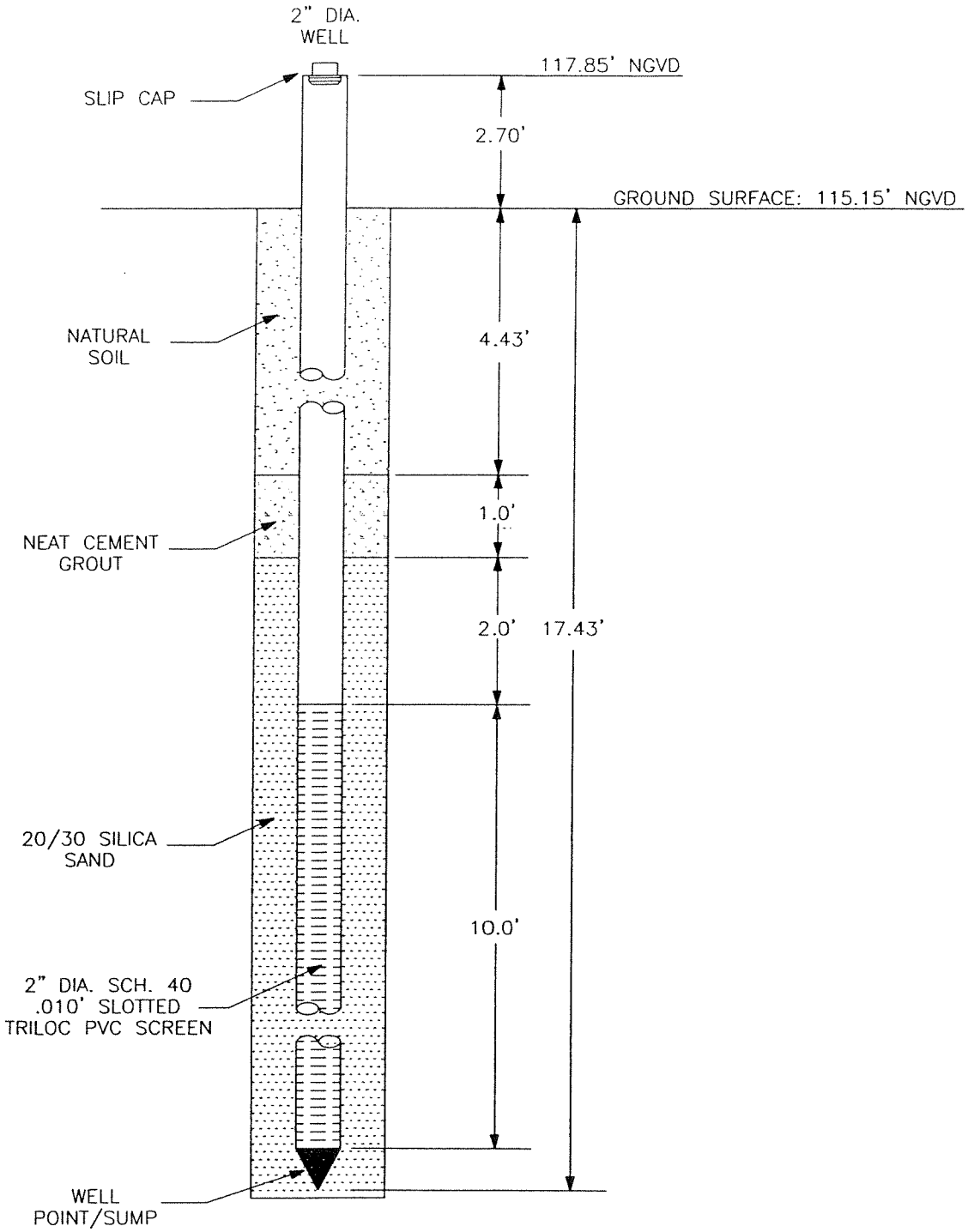
BALDWIN PARK

AREA 36

ORANGE COUNTY, FLORIDA

DRAWN:	MG
CHKD:	LW
SCALE:	N.T.S.
DATE:	7-18-02
PROJ. NO:	W99-E-186-2
DETAIL:	12

NODARSE & ASSOCIATES, INC.



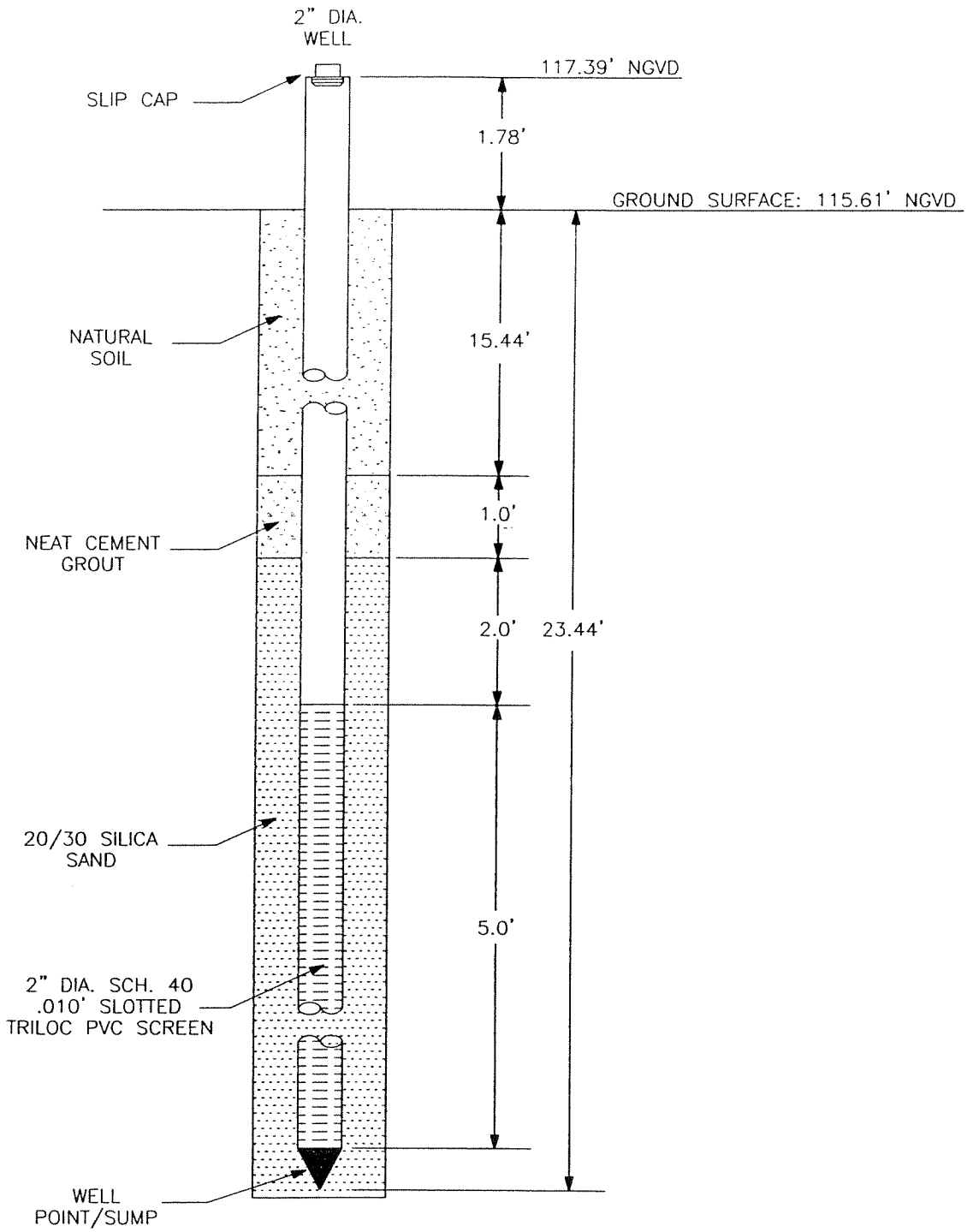
WELL No. OLD 36-19AR

INSTALLATION REPORT

INSTALLATION DATE:	5-1-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 7



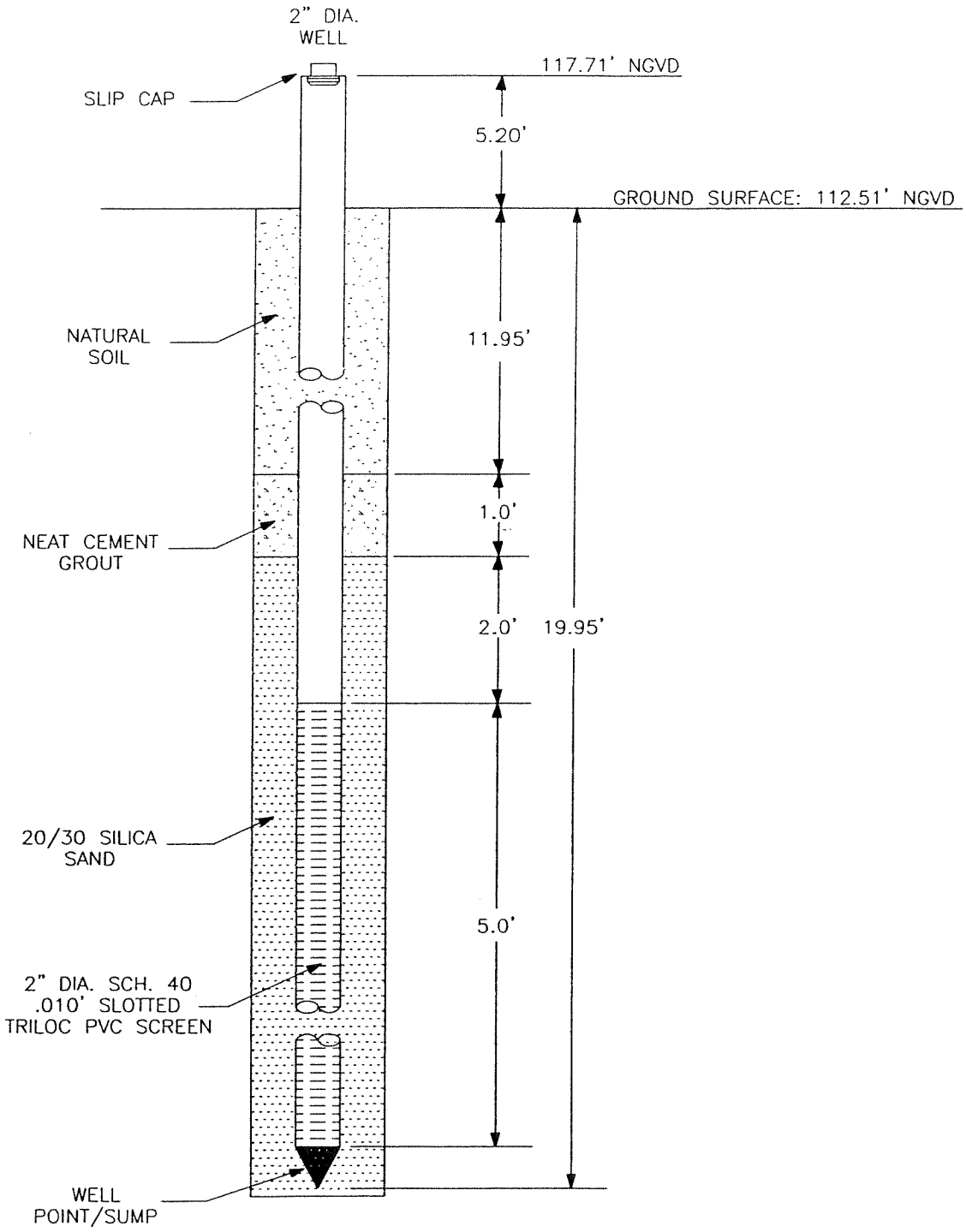
WELL No. OLD 36-20BR

INSTALLATION REPORT

INSTALLATION DATE:	5-1-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 8



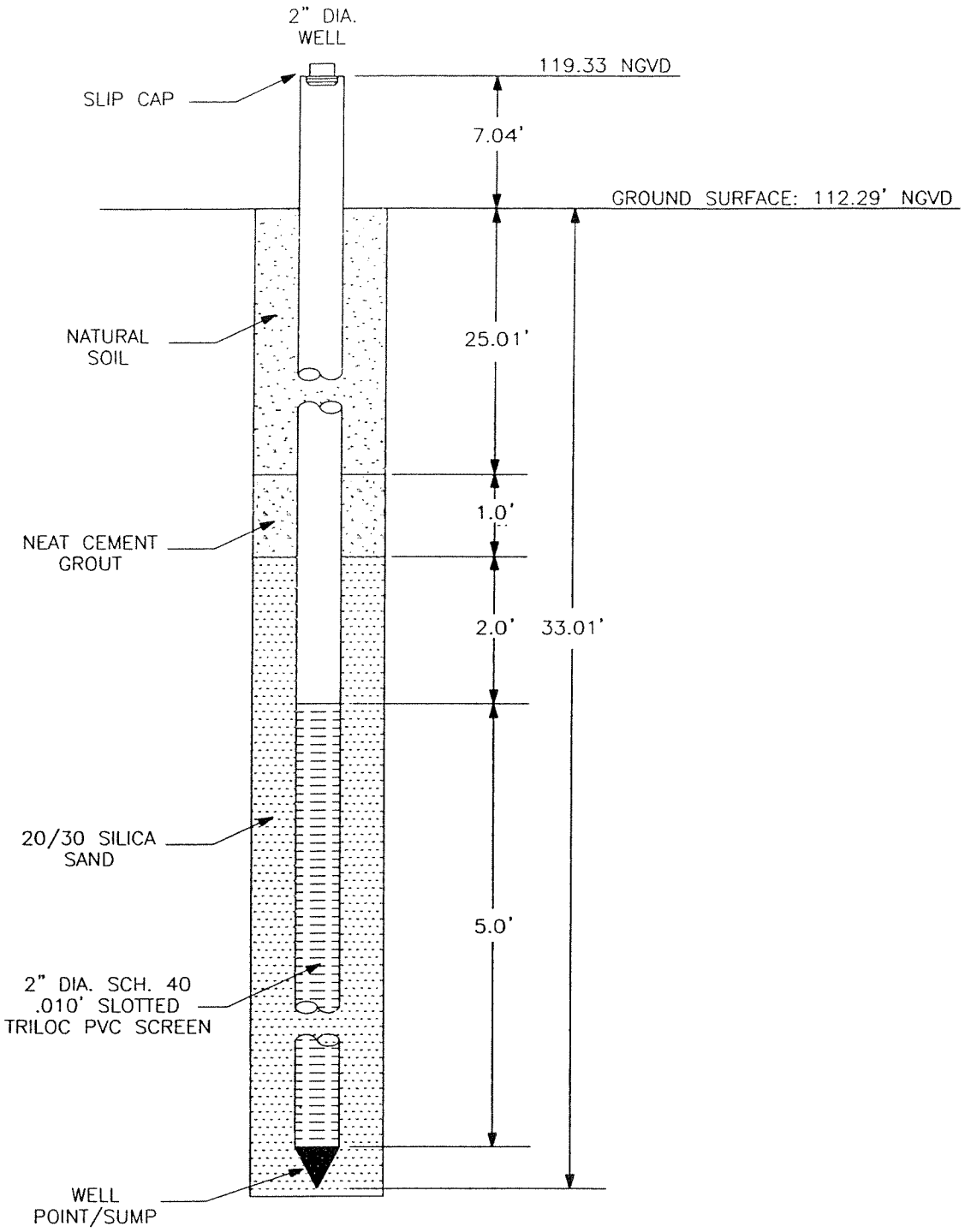
WELL No. OLD 36-22BR

INSTALLATION REPORT

INSTALLATION DATE:	4-29-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 2



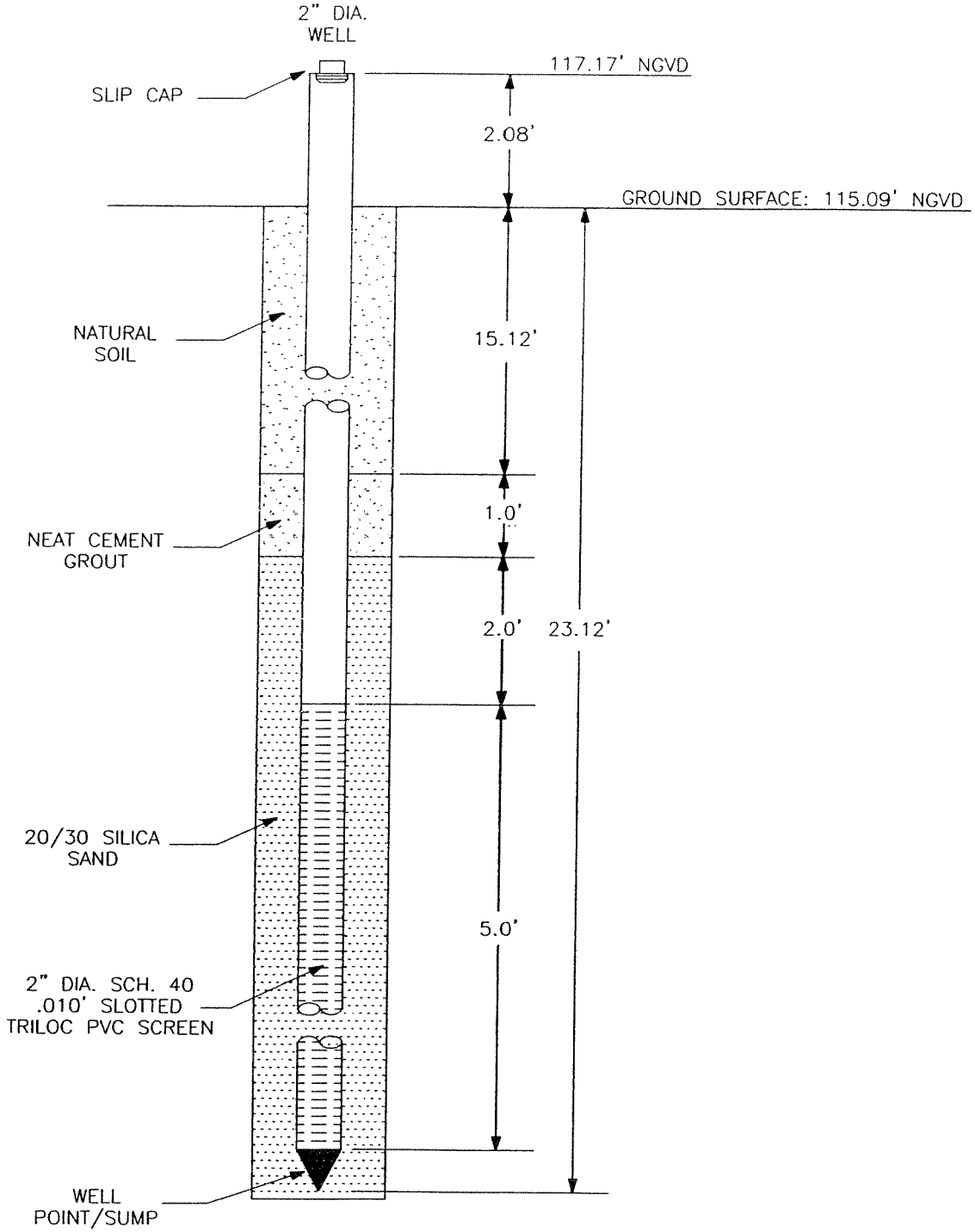
WELL No. OLD 36-23CR

INSTALLATION REPORT

INSTALLATION DATE:	4-29-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 3



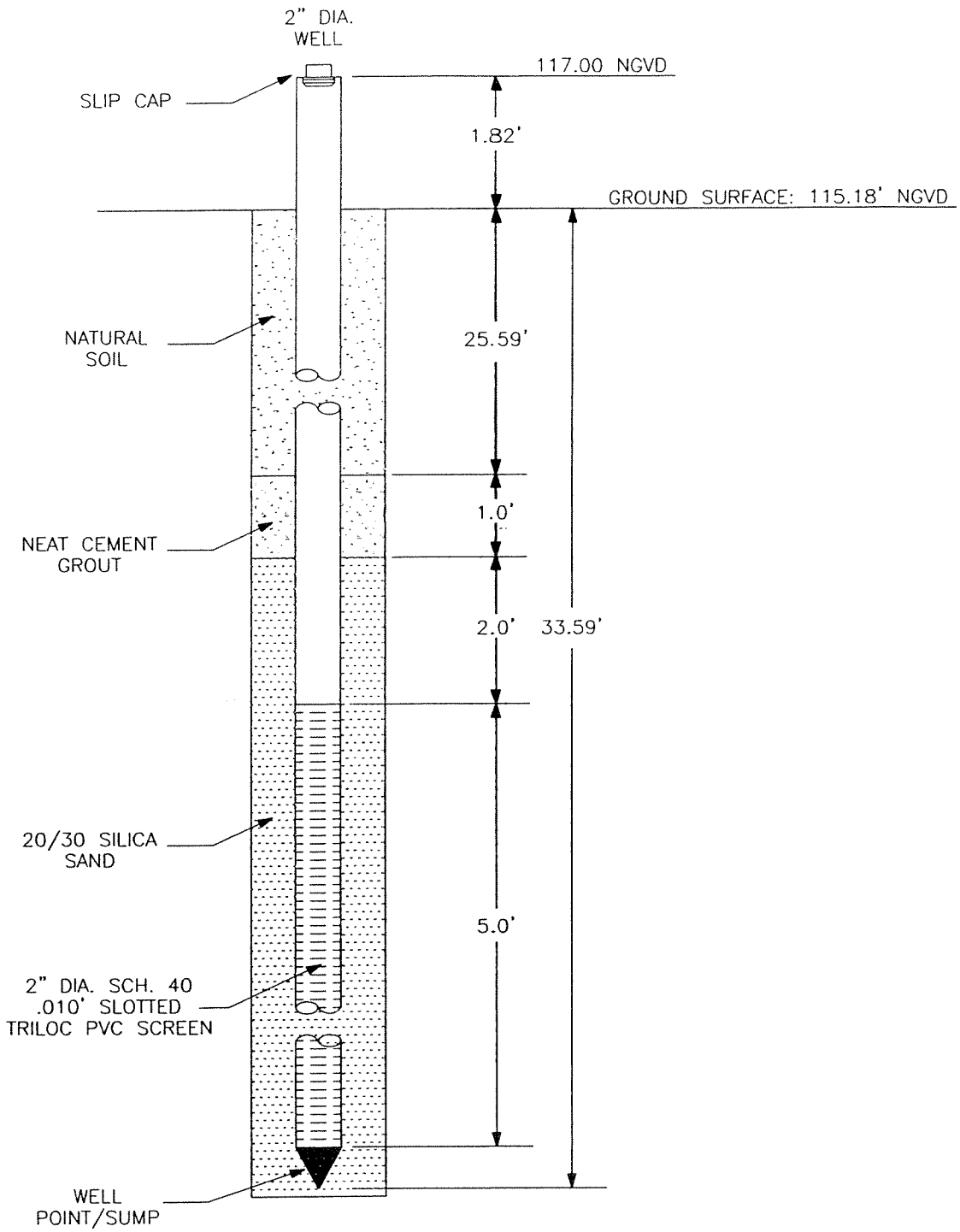
WELL No. OLD 36-24BR

INSTALLATION REPORT

INSTALLATION DATE:	4-30-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 16



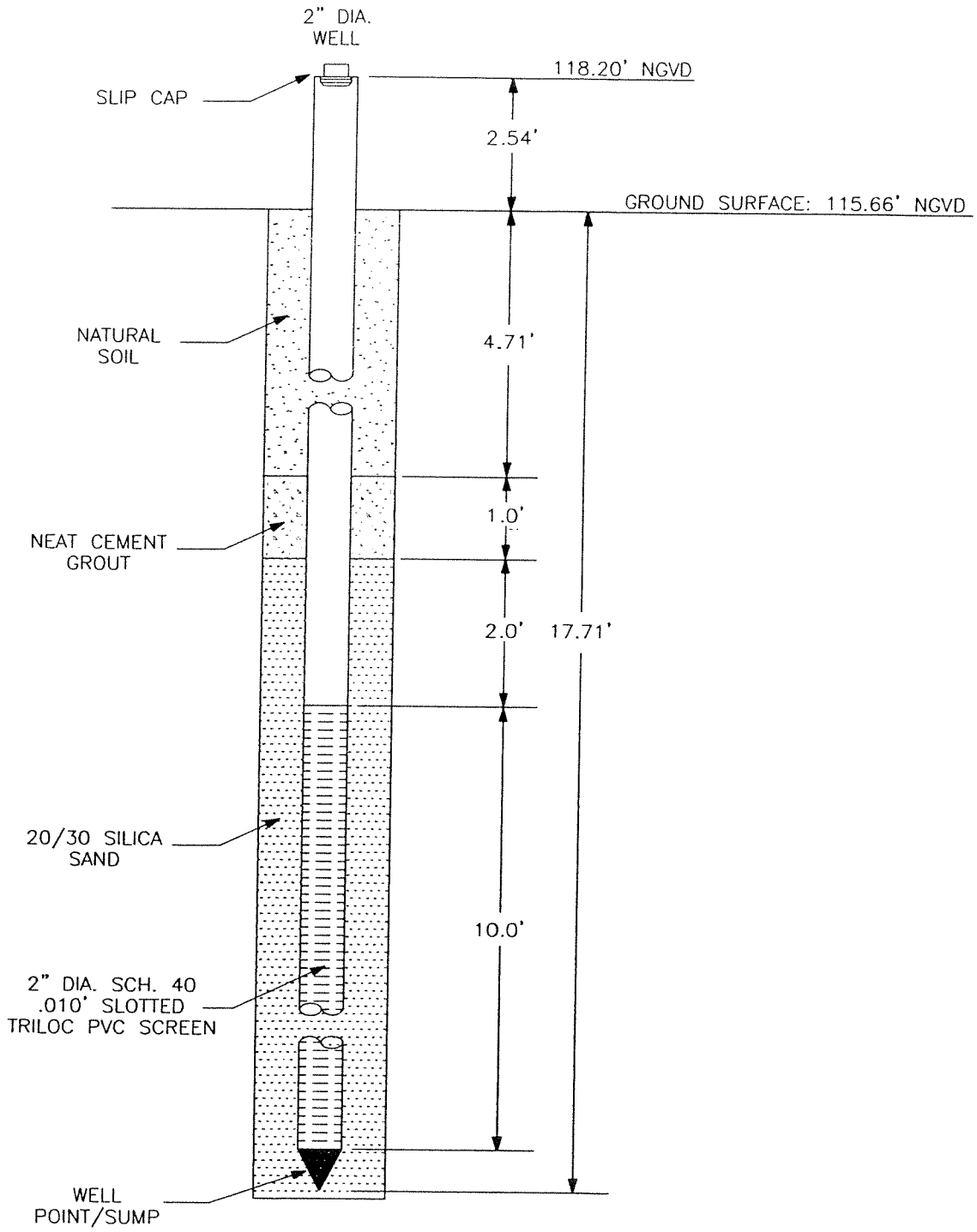
WELL No. OLD 36-25CR

INSTALLATION REPORT

INSTALLATION DATE:	4-29-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 13



WELL No. OLD 36-33AR

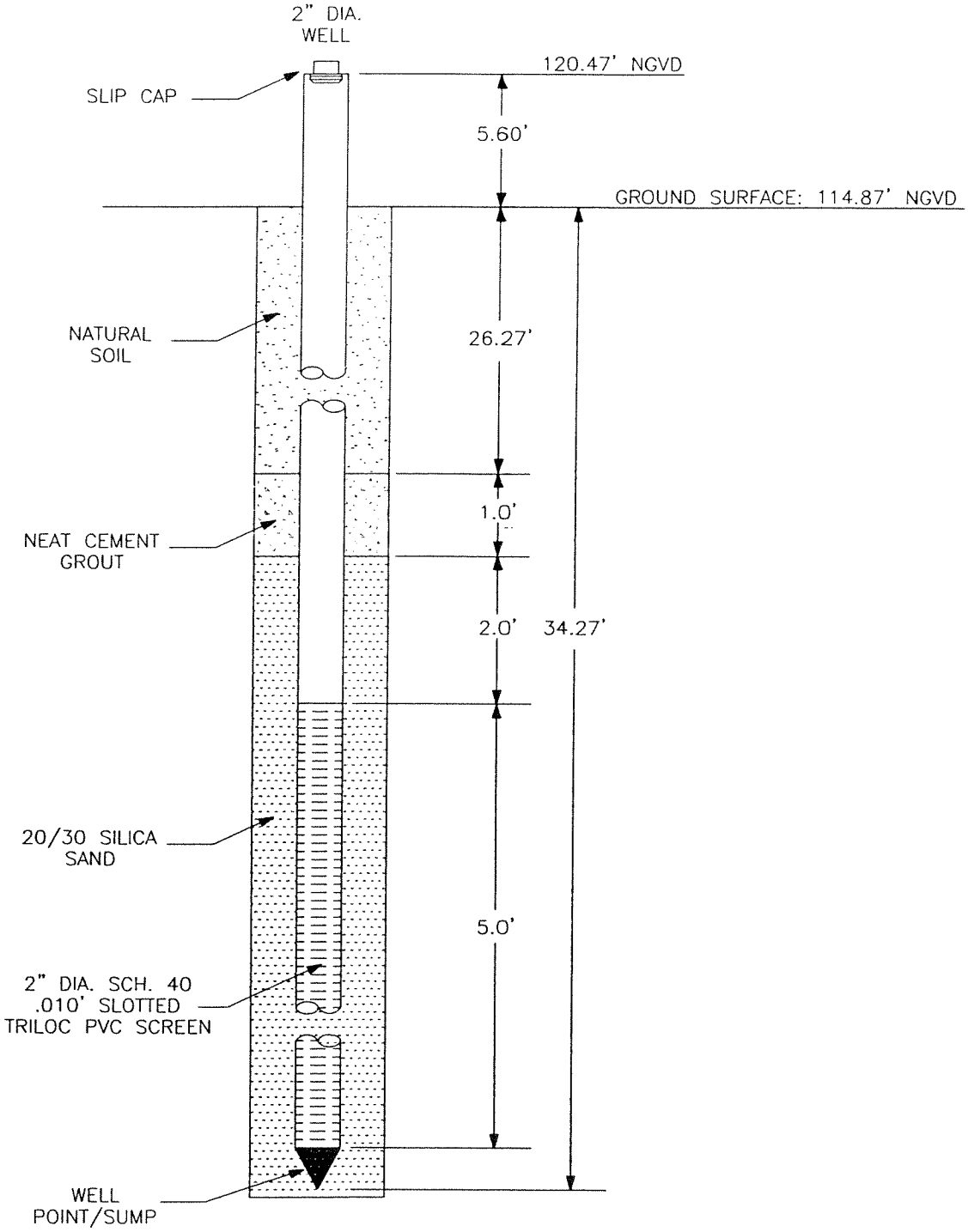
INSTALLATION REPORT

INSTALLATION DATE:	4-30-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN:	MG
CHKD:	LW
SCALE:	N.T.S.
DATE:	7-18-02
PROJ. NO:	W99-E-186-2
DETAIL:	15

NODARSE & ASSOCIATES, INC.



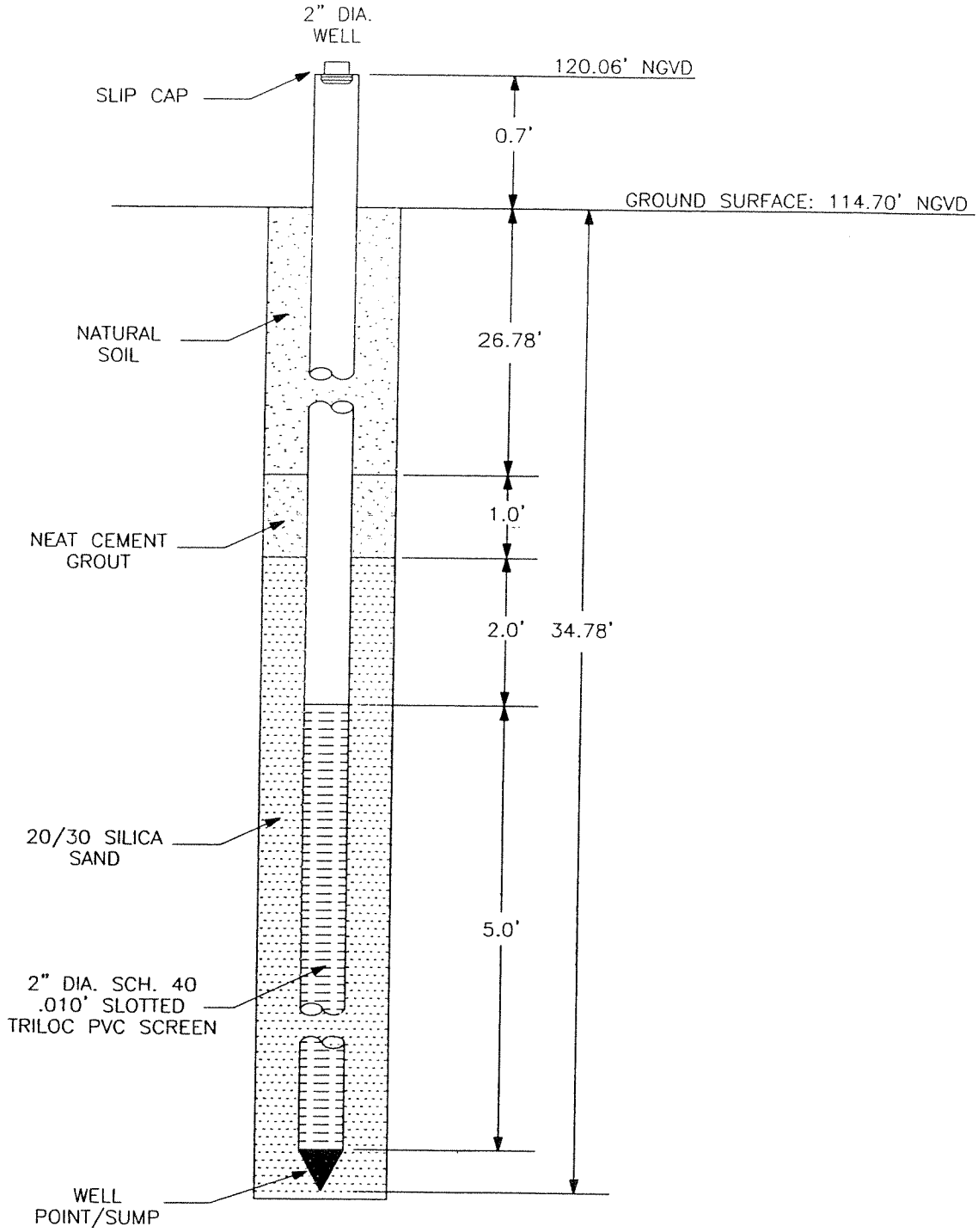
WELL No. OLD 36-35CR

INSTALLATION REPORT

INSTALLATION DATE:	4-29-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 14



WELL No. OLD 36-36CR

INSTALLATION REPORT

INSTALLATION DATE:	4-30-02
INSTALLED BY:	DTD
INSTALLATION METHOD:	HOLLOW STEM

WELL CONSTRUCTION DETAIL
BALDWIN PARK
AREA 36
ORANGE COUNTY, FLORIDA

DRAWN: MG	NODARSE & ASSOCIATES, INC.	
CHKD: LW		
SCALE: N.T.S.		
DATE: 7-18-02	PROJ. NO: W99-E-186-2	DETAIL: 17

APPENDIX B

FIELD SAMPLING FORMS

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S01001 ~~NTC3001001~~ (B)
Sample Location: SA 36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date	Time	Method	Monitor Reading (ppm)	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
041600	0840	HA		0-1ft	gray	med-grnd SAND, loose, moist

COMPOSITE SAMPLE DATA:

Date	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
~~041600~~				

Method: ~~HA~~

Monitor Readings (Range in ppm):

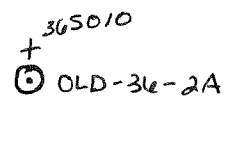
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Hg	4oz glass	1	

OBSERVATIONS / NOTES:

tan sand & gravel fill from below asphalt to 8"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Shep Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[✓] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S01101
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[✓] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 0856 Method: HA Monitor Reading (ppm):	0-1ft	lt. gray	med.-grnd, silty SAND, loose, moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Hg	4oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-1.5"
tan sand & gravel fill 1.5"-6"

MAP:

+ 365011

⊙ OLD-36-2A

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Shyp Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC 36 501201
Sample Location: SA 36
Sampled By: SB/GS
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 0911 Method: HA Monitor Reading (ppm):	0 - 1ft	lt. gray	med.-grnd SAND, loose, damp, some dk grains

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Hg	4 oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-1.5"
tan sand & gravel fill 1.5"-6"

MAP:

+ 365012

⊙ OLD-36-2A

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Guy Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S01301
Sample Location: SA 36
Sampled By: SB / GS
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 0934 Method: HA Monitor Reading (ppm):	0-1ft	dk gray	med.-grnd, silty SAND, loose, damp

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Hg	4oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-1.5"
tan to buff sand & gravel fill 1.5"-6"

MAP:

⊙ OLD-36-2A

+ 365013

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Shep Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[✓] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S01401
Sample Location: SA36
Sampled By: SB / GS
C.O.C. No.:

Type of Sample:
[✓] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 0951 Method: HA Monitor Reading (ppm):	0-1 ft	lt. gray to white	SAND, med.-grnd., loose, damp

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

asphalt 0-1.5"
tan sand & gravel fill 1.5"-6"

MAP:

⊙ OLD-36-2A

+ 365014

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Shyp Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S01S01
Sample Location: SA 36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1004 Method: HA Monitor Reading (ppm):	0-1ft	white & dark gray	SAND, med-grnd, some silt, loose, gravel below 8"

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

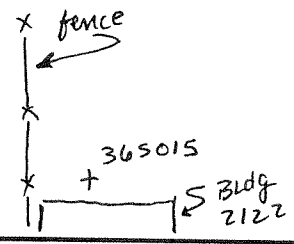
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Ba	4oz glass	1	

OBSERVATIONS / NOTES:

white sand 0-2"
brown pea gravel 2"-4"
dark gray sand 4"-8"
white ~~gravel +~~ sand + gravel 8"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Shep Santry

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[✓] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S01601
Sample Location: SA 36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[✓] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1024 Method: HA Monitor Reading (ppm):	0-1ft	lt. gray	SAND, silty, fine-grnd., loose, dry

COMPOSITE SAMPLE DATA:

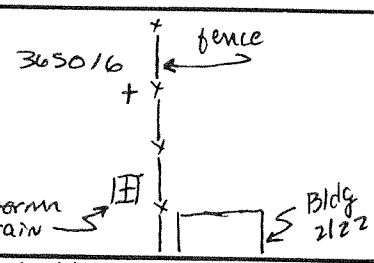
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Ba	4 oz glass	1	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC36S01701
Sample Location: SA 36
Sampled By: SB / GS
C.O.C. No.:

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1036 Method: HA Monitor Reading (ppm):	0-1 ft	lt & drk gray	SAND, silty, loose, damp, med.-grnd

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

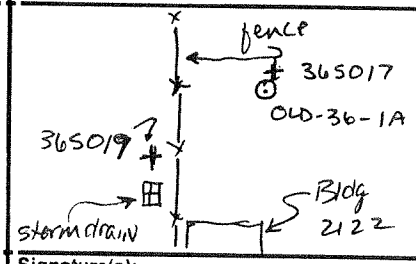
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TRPH (FL-PRO)	4 oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-1.5"
tan sand & gravel fill 1.5"-6"
~~dark gray~~
lt gray sand 6"-10"
drk gray sand 10"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Steve Barter

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S01801
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1100 Method: HA Monitor Reading (ppm):	0-1ft	gray	SAND, med.-grnd, loose, some silt, moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

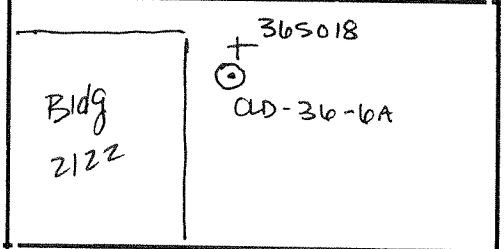
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TRPH (FL-PRO)	4 oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-1.5"
tan sand & gravel fill 1.5"-6"
gray sand 6"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S01901
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1122 Method: HA Monitor Reading (ppm):	0-1ft	dk gray	SAND, med-grnd., mod. dense, moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

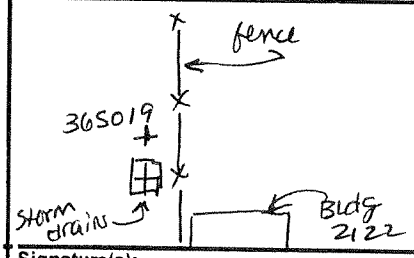
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TRPH (FL-PRO)	4oz glass	1	

OBSERVATIONS / NOTES:

dk gray to black sandy loam 0-8"
gray sand 8"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Skip Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S02001
Sample Location: SA36
Sampled By: SB / GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1142 Method: HA Monitor Reading (ppm):	0-1 ft	lt. gray	SAND, silty, dry, loose, fine to med-grnd.

COMPOSITE SAMPLE DATA:

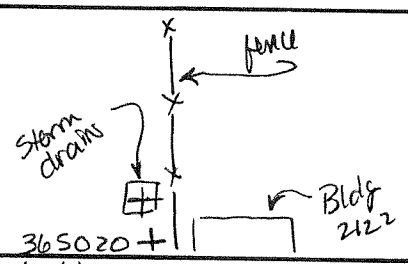
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
TRPH (FL-PRO)	4oz glass	1	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
	NTC36D1001

Signature(s): Shiya Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC36502101
Sample Location: SA36
Sampled By: SB / GS
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date: 041600	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1305	0-1ft	gray	SAND, med.-grand, loose, damp
Method: HA			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

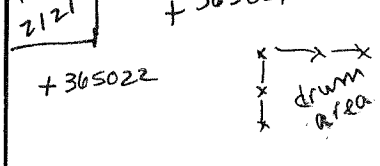
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-1.5"
white sand & gravel fill 1.5"-6"
brown sandy topsoil 6"-8"
gray sand 8"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [signature]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC36S02201
Sample Location: SA 36
Sampled By: SB/GS
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1315 Method: HA Monitor Reading (ppm):	0-1 ft	lt gray	SAND, med-grained, w/ silt, loose, moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

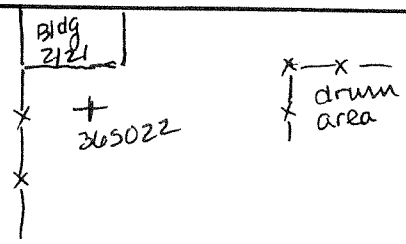
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	1	

OBSERVATIONS / NOTES:

white sand & gravel fill 0-6"
lt. gray sand 6"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [signature]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 2457

Sample ID No.: NTC 36 S02301
Sample Location: S436
Sampled By: SB / GS
C.O.C. No.:

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1320 Method: HA Monitor Reading (ppm):	0-1 ft	lt gray-brown	SAND, med to coarse-grnd, loose, moist, silty

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

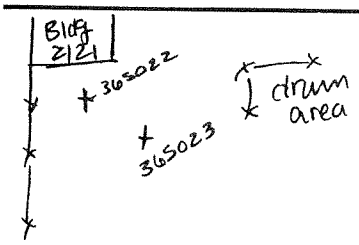
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	1	

OBSERVATIONS / NOTES:

white sand & gravel fill 0-6"
~~Bore~~ sand 6"-12"
SB

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC 36 SO2401
Sample Location: SA 36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: (SD) ~~1380~~ 1330 Method: Monitor Reading (ppm):	0-1 ft	gray	SAND, silty, med to coarse-grind, loose, moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

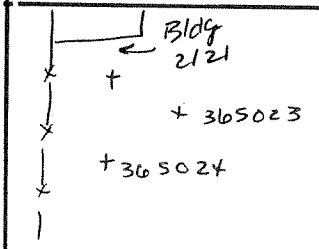
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	1	

OBSERVATIONS / NOTES:

white sand & gravel fill - packed 0-6"
sand 6"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Steve Bartny

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S02501
Sample Location: S436
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 04/6/00 Time: 1338 Method: HA Monitor Reading (ppm):	0-1ft	gray-brown	SAND, med-grnd, silty, loose, damp

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

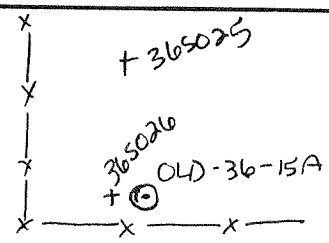
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4 oz glass	1	

OBSERVATIONS / NOTES:

White sand & gravel fill, packed 0-7"
gray-brown sand 7"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [signature]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC36S02601
Sample Location: SA36
Sampled By: SB/AS
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 04/6/00 Time: 1348 Method: HA Monitor Reading (ppm):	0-1 ft	gray	SAND, fine to med-grad, trace silt, loose, damp

COMPOSITE SAMPLE DATA:

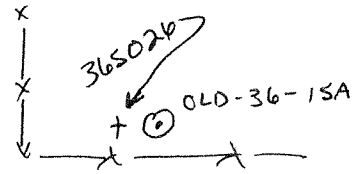
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	/	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): [illegible]

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC 36502701
Sample Location: SA 36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1359 Method: HA Monitor Reading (ppm):	0-12"	Gray	SAND; silty, med.- to coarse grnd., damp, loose

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

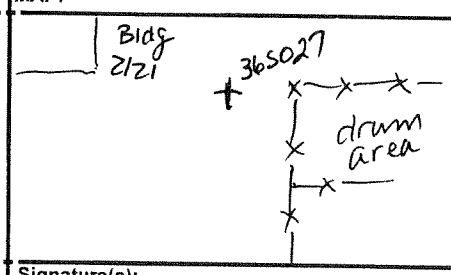
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-1.5"
white gravel & sand fill 1.5"-6"
gray sand 6"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Skip Ranton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC36S02801
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1412 Method: HA Monitor Reading (ppm):	0-1 ft	gray	SAND; med-grnd., loose, damp

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

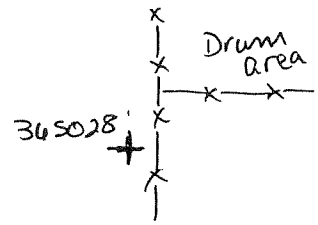
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	1	

OBSERVATIONS / NOTES:

white sand & gravel, packed 0-8"
gray sand 8"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Steve Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 2457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S02901
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1433 Method: HA Monitor Reading (ppm):	0 - 1 ft	gray	SAND; silty, med-grnd, dry, loose

COMPOSITE SAMPLE DATA:

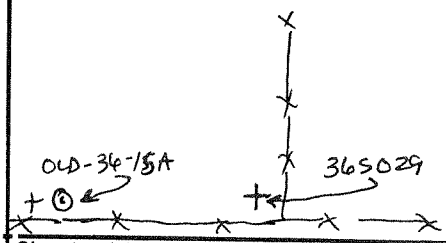
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	1	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Skip Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC36S03001
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041600 Time: 1350 Method: HA Monitor Reading (ppm):	0-1ft	gray	SAND; silty, med.-grnd., damp, loose

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

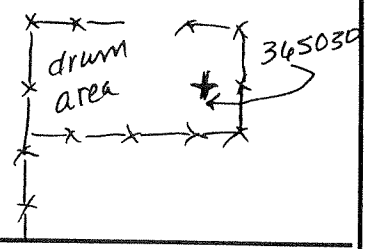
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	2 (1 dupe)	

OBSERVATIONS / NOTES:

asphalt 0-2"
White sand & gravel fill 2"-6"
gray sand 6"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
	NTC36D1002

Signature(s): Shyp Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC36S03101
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

Date: 041700 Time: 0848 Method: HA Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
	0 - 1ft	lt. gray	SAND; fine-grnd, loose, damp, some silt

COMPOSITE SAMPLE DATA:

Date: Method: Monitor Readings (Range in ppm):	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

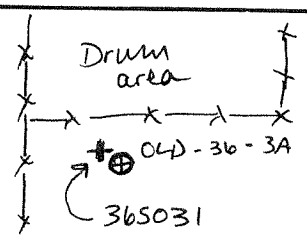
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb + FL-PRO	4oz glass	2	

OBSERVATIONS / NOTES:

asphalt 0-6"
buff sand & gravel fill 6"-8"
sand 8"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC 36032 01
Sample Location: SA36
Sampled By: SB/DS
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 04/17/00 Time: 0905 Method: HA Monitor Reading (ppm):	0-1 ft	gray	SAND; silty, fine-grnd, moist, mod. loose

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

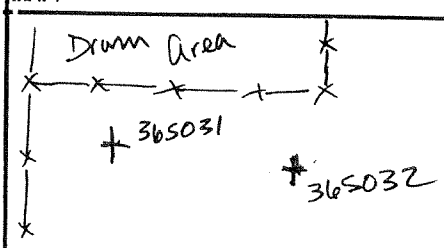
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4 oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-4"
buff sand & gravel fill 4"-8"
gray sand 8"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Steve Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC36503301
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041700 Time: 0923 Method: HA Monitor Reading (ppm):	0-1 ft	dk gray	SAND; silty, fine-grnd., loose, moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

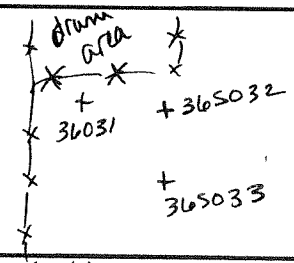
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4 oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-4"
buff sand & gravel fill 4"-8"
gray sand 8"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Skip Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC 36S03401
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041700 Time: 0940 Method: H4 Monitor Reading (ppm):	0-1 ft	brown & gray	SAND; silty, med-grnd, moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

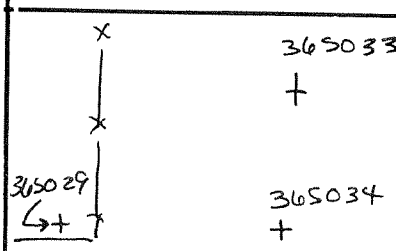
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4 oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-2"
white sand & gravel fill 2"-6"
brown & gray sand 6"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Skip Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

Sample ID No.: NTC3603501
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041700 Time: 0739 Method: HA Monitor Reading (ppm):	0-1ft	gray	SAND; silty, fine-grnd., moist, loose

COMPOSITE SAMPLE DATA:

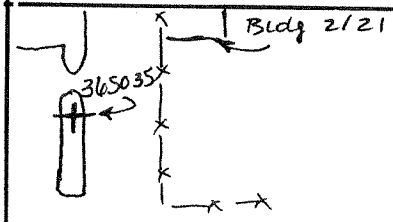
Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
Sb + As	4oz glass	1	

OBSERVATIONS / NOTES:

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Shep Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: NTC 36SO 36001
Sample Location: SA36
Sampled By: SB/GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041700 Time: 0950 Method: HA Monitor Reading (ppm):	0 - 1ft	gray	SAND; silty, med-grnd, moist, loose

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

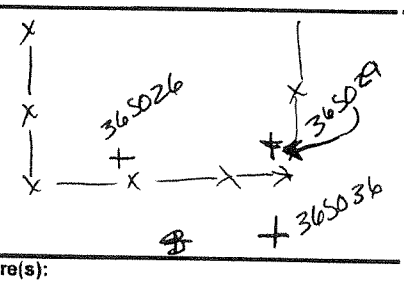
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4 oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-1.5"
white sand & gravel fill 1.5"-5"
gray sand 5"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Shep Barton

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: NTC Orlando
Project No.: 7457

[x] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Sample ID No.: BTC36S03701
Sample Location: SA 36
Sampled By: SB / GS
C.O.C. No.:

Type of Sample:
[x] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 041700 Time: 1005 Method: HA Monitor Reading (ppm):	0-1ft	lt. gray	SAND; fine-grnd., loose, moist

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

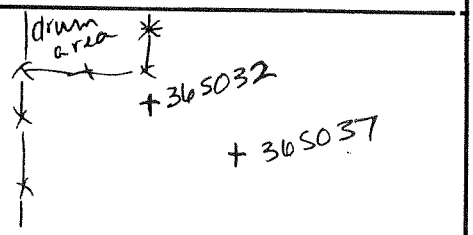
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
As + Sb	4oz glass	1	

OBSERVATIONS / NOTES:

asphalt 0-4"
white sand & gravel fill 4"-8"
gray sand 8"-12"

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s): Steve Santini

SA 36

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NTC Orlando **Project No.:** 7457
Location: Study Area 36 **Personnel:** Knight / Bobo
Weather Conditions: PC, light SW wind, 80° **Measuring Device:** HERON WLI
Tidally Influenced: Yes ___ No X **Remarks:**

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
OLD-36-01A	4/10/00	1452		17.0	8.86			
OLD-36-02A				17.0	8.81			
OLD-36-06A				17.0	8.76			
OLD-36-07A				26.0	8.76			
OLD-36-08B				28.0	9.12			
OLD-36-09C				30.0	13.14			
OLD-36-10B				24.0	9.23			
OLD-36-11C				35.0	12.58			
OLD-36-12C				35.0	12.93			
OLD-36-13D				65.0	12.94			
OLD-36-14D		1508		65.0	13.49			
OLD-36-15A								NOT DEVELOPED YET

DAB

* All measurements to the nearest 0.01 foot

Page ____ of ____

Groundwater Purging and Sampling Log

Tetra Tech NUS

Date 041700

Page 1 of 1

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: SA36-01

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos.: 9272043

Sample ID No.: NTC36601A10

Sampled By: BRB

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	0850	5.33	10	24.5	103.5	2.37	177	8.70	100
1	0.041 / 0.155	0900	5.34	9	24.9	101.2	1.39	171	8.71	100
2	0.163 / 0.617	0910	5.33	9	25.0	98.3	1.05	167	8.73	100
4	0.653 / 2.47	0920	5.34	9	25.2	97.5	1.03	165	8.74	100
6	1.469 / 5.56	0930	5.33	8	25.4	95.0	1.06	163	8.74	100
8	2.611 / 9.88	0940	5.33	8	25.5	92.6	0.84	159	8.74	100
10	4.08 / 15.44	0950	5.31	8	25.7	91.5	0.79	157	8.74	100
	[1 gal. = 3.785 L]	1000	5.32	8	25.9	89.2	0.81	155	8.74	100
		1010	5.31	8	25.9	88.0	0.68	152	8.74	100
PID Reading (ppm): 0		1020	5.31	8	26.0	85.0	0.66	155	8.74	100
		1030	5.31	8	26.1	82.1	0.62	147	8.74	100
		1040	5.31	8	26.1	82.3	0.61	146	8.74	100

Well Casing Diameter: 2"
Total Well Depth: 17'
Static Water Level: 8.62
Tube Intake Depth: 12'

Start Purge (hr): 0825
End Purge (hr): 1040
Total Purge Time (min): 135
Total Vol. Purged: ~3.5 gal

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 041700									
Time: ~~0850~~ 1050	clear	5.31	8	26.1	82.3	0.61	146	8.74	N/M

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	X
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	X

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD: N/A

Duplicate ID No.: N/A

Signature(s):

Groundwater Purging and Sampling Log

Tetra Tech NUS

Date 041600

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: SA 36-02

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC 36 02 A10

[X] Monitoring Well Data

Serial Nos.: 927 2043

Sampled By: BRB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	1710	5.40	14	26.5	109.7	0.00	-20	8.84	150
1	0.041 / 0.155	1720	5.21	11	26.5	105.2	0.00	-0	8.83	100
2	0.163 / 0.617	1730	5.05	9	26.4	104.1	0.00	12	8.83	100
4	0.653 / 2.47	1740	4.94	7	26.4	104.4	0.00	19	8.83	100
6	1.469 / 5.56	1750	4.89	7	26.4	100.2	0.00	21	8.83	100
8	2.611 / 9.88	1800	4.84	7	26.5	97.2	0.00	23	8.83	100
10	4.08 / 15.44	1805	4.83	7	26.5	96.5	0.00	24	8.83	100
	[1 gal. = 3.785 L]	1810	4.82	7	26.5	96.5	0.00	24	8.83	100

slowed pump

PID Reading (ppm): 0

Well Casing Diameter: 2"
Total Well Depth: 17
Static Water Level: 8.81
Tube Intake Depth: 12.0

Start Purge (hr): 1700
End Purge (hr): 1810
Total Purge Time (min): 70
Total Vol. Purged: ~2 gal

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 041600									
Time: 1815	Brownish	4.82	7	26.5	96.5	0.00	24	8.83	N/A

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	X
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD: N/A

Duplicate ID No.: N/A

Signature(s):

Date 4/16/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD - 36 - 06A

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC36G06A10

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: R. Frankl.

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	1520	5.37	0.115	27.3	76.9	5.18	201	8.82	100
1	0.041 / 0.155	1530	5.29	0.114	27.5	74.2	2.26	200	8.84	100
2	0.163 / 0.617	1540	5.31	0.113	27.5	74.8	2.06	192	8.84	100
4	0.653 / 2.47	1550	5.32	0.113	27.5	71.9	2.05	188	8.83	100
6	1.469 / 5.56	1600	5.31	0.112	27.4	73.2	1.99	185	8.83	100
8	2.611 / 9.88	1610	5.32	0.112	27.4	69.8	1.94	184	8.83	100
10	4.08 / 15.44	1620	5.32	0.111	27.3	69.0	1.93	182	8.83	100
	[1 gal. = 3.785 L]									

PID Reading (ppm):

Well Casing Diameter: 2"
Total Well Depth: 17'
Static Water Level: 8.76'
Tube Intake Depth: 13'

Start Purge (hr): 1500
End Purge (hr): 1620
Total Purge Time (min): 80
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 4/16/00									
Time: 1630	Clear	5.32	0.111	27.3	69.0	1.93	182	8.83	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	X
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[√] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Date 4/10/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

SA36
Sample Location: OLD-36-07A

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC36G07A10

[X] Monitoring Well Data

Serial Nos.: 9272097

Sampled By: CM

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	1537	5.69	13.0	27.6	175	1.01	90	9.10	130
1	0.041	0.155	1547	5.61	13.0	27.6	189	0.55	84	9.05	120
2	0.163	0.617	1557	5.59	12.0	27.7	194	0.29	81	9.00	100
4	0.653	2.47	1607	5.56	12.0	27.7	203	0.32	81	8.95	100
6	1.469	5.56	1617	5.55	12.0	27.6	220	0.45	83	8.92	100
8	2.611	9.88	1627	5.52	12.0	27.8	230	0.24	79	8.92	100
10	4.08	15.44	1637	5.52	12.0	27.7	240	0.40	82	8.96	100
	[1 gal. = 3.785 L]		1642	5.53	12.0	27.0	240	0.24	78	8.97	100
			1647	5.51	12.0	27.5	240	0.27	79	8.97	100
PID Reading (ppm): 0			1650	5.52	12.0	27.5	240	0.28	79	8.97	100

Well Casing Diameter: 2"
Total Well Depth: 20.0'
Static Water Level: 8.70'
Tube Intake Depth: 17.0'

Start Purge (hr): 1523
End Purge (hr): 1650
Total Purge Time (min): 87
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 4/10/00									
Time: 1655	brown	5.52	12.0	27.5	240	0.28	79	8.97	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
~~[ ] Tube Evacuation~~
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

CM 4/10/00

QA\QC SAMPLES

MS/MSD: N/A

Duplicate ID No.: N/A

Signature(s): Chris Morin

Date 4/10/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

SA36
Sample Location: OLD-36-08

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC 36 0608B10

[X] Monitoring Well Data

Serial Nos.: 9272023

Sampled By: BK

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	1537	4.96	12.6	23.36	15.6	1.01	17	11.82	~130
1	0.041 / 0.155	1545	4.93	12.8	23.54	14.2	1.12	18	12.05	~100
2	0.163 / 0.617	1550	4.96	12.3	23.24	15.0	1.05	15	12.32	~100
4	0.653 / 2.47	1555	4.96	12.2	23.31	14.0	1.10	11	12.28	~100
6	1.469 / 5.56	1600	4.99	12.2	23.34	14.1	1.04	11	12.26	~100
8	2.611 / 9.88	1605	5.00	12.4	23.26	13.8	0.92	10	12.25	~100
10	4.08 / 15.44	1610	5.02	12.4	23.14	13.7	0.85	7	12.25	~90
	[1 gal. = 3.785 L]	1615	5.02	12.4	22.99	13.8	0.77	7	12.31	~90
		1620	5.04	12.3	22.88	14.0	0.72	5	12.29	~90
PID Reading (ppm): Ø		1625	5.02	12.2	22.91	13.9	0.68	5	12.30	~90
		1630	4.99	12.2	22.91	14.0	0.66	5	12.31	~90

Well Casing Diameter: 2"
Total Well Depth: 28.0
Static Water Level: 9.12
Tube Intake Depth:

Start Purge (hr): 1525
End Purge (hr): 1630
Total Purge Time (min): 55
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 041600									
Time: 1630	clear	4.99	12.2	22.91	14.0	0.66	5	12.31	~90

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments:
Turbidity would not drop below 10 NTU. Pump speed was min. pump would flow.

Method:
[ ] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD: N/A

Duplicate ID No.: N/A

Signature(s): Robert L. Knight

Groundwater Purging and Sampling Log
Tetra Tech NUS

Date 4/16/00

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-09C

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos: 92982036

Sample ID No.: NTC36G09D

Sampled By: R. Franklin

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	1725	11.6	1.14	26.7	58.8	3.83	-139	13.82	100
1	0.041	0.155	1745	11.72	1.80	26.4	53.9	2.28	-242	13.92	100
2	0.163	0.617	1755	11.84	1.92	26.5	47.1	1.54	-256	13.61	100
4	0.653	2.47	1405	11.88	2.00	26.6	35.7	1.17	-264	13.53	100
6	1.469	5.56	1915	11.88	2.08	26.7	30.2	0.91	-279	13.52	100
8	2.611	9.88	1825	11.94	1.94	26.5	25.7	0.66	-292	13.65	100
10	4.08	15.44	1835	11.88	1.95	26.3	22.7	0.56	-294	13.71	100
	[1 gal. = 3.785 L]										

- recal Horiba per pH

PID Reading (ppm):

Well Casing Diameter: 2"
Total Well Depth: 36.00'
Static Water Level: 13.14'
Tube Intake Depth: 34'

Start Purge (hr): 1710
End Purge (hr): 1840
Total Purge Time (min): 90
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 4/16/00									
Time: 1840	Clear	11.88	1.95	26.3	22.7	0.56	-294	13.71	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	X
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Date 4/17/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-10B

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC36G101310

[X] Monitoring Well Data

Serial Nos.: 9292036

Sampled By: [illegible]

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	0845	6.31	0.178	25.5	136	3.10	-50	9.02	100
1	0.041 / 0.155	0855	6.27	0.164	25.7	143	1.02	-65	9.02	100
2	0.163 / 0.617	0905	6.27	0.157	25.9	143	0.86	-72	9.02	100
4	0.653 / 2.47	0915	6.27	0.154	26.1	145	0.76	-76	9.02	100
6	1.469 / 5.56	0925	6.26	0.151	26.3	145	0.73	-79	9.02	100
8	2.611 / 9.88	0935	6.28	0.152	26.9	142	0.95	-83	9.02	100
10	4.08 / 15.44	0945	6.27	0.150	26.8	143	0.82	-81	9.02	100
	[1 gal. = 3.785 L]	0955	6.26	0.151	27.0	148	0.77	-85	9.02	100
		1005	6.26	0.151	27.0	154	0.76	-87	9.02	100

PID Reading (ppm):

Well Casing Diameter: 2"
Total Well Depth: 24'
Static Water Level: 8.98
Tube Intake Depth: 8'16'

Start Purge (hr): 0825
End Purge (hr): 1005
Total Purge Time (min): 100
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 4/17/00									
Time: 1015	Clear	6.26	0.151	27.0	154	0.76	-87	9.02	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	X
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): [illegible]

Date 11/17/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

SA36
Sample Location: OLD-36-11C

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos.: 9272097

Sample ID No.: NTC36G11C10
Sampled By: BK
C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	0900	5.22	10	26.0	11	1.47	6	12.69	~75
1	0.041	0.155	0910	5.21	10	26.0	10	0.61	0	12.84	~75
2	0.163	0.617	0920	5.21	10	26.1	10	0.46	0	12.90	~75
4	0.653	2.47	0930	5.21	10	26.1	11	0.47	5	12.90	~75
6	1.469	5.56	0935	5.22	10	26.1	11	0.48	0	12.90	~75
8	2.611	9.88	0940	5.22	10	26.3	12	0.47	1	12.90	~75
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): 0

Well Casing Diameter: 2"
Total Well Depth: 35.0
Static Water Level: 12.58'
Tube Intake Depth: 33'

Start Purge (hr): 0855
End Purge (hr): 0945
Total Purge Time (min): 50
Total Vol. Purged: NA

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 041700									
Time: 0945	Clear	5.22	10	26.3	12	0.47	1	12.90	~75

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments:
MS/MSD sample collected (6 x 40 ml)

Method:
[ ] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD: NTC36G11C10MSMSD

Duplicate ID No.:

Signature(s): Robert L. Knight

Date 4/17/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

SA36
Sample Location: OLD-36-12

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos.: 92M2023

Sample ID No.: NTC36G12C10
Sampled By: CM
C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	0858	5.76	11.2	21.5	14.0	9.47	132	12.95	100
1	0.041 / 0.155	0908	5.77	10.9	21.6	14.6	9.21	118	12.92	100
2	0.163 / 0.617	0913	5.75	10.7	21.7	17.4	8.71	114	12.92	100
4	0.653 / 2.47	0918	5.75	10.5	21.8	18.8	8.42	114	12.92	100
6	1.469 / 5.56	0923	5.75	10.4	21.9	21.5	8.12	112	12.92	100
8	2.611 / 9.88	0928	5.75	10.3	22.0	25.1	6.68	112	12.92	100
10	4.08 / 15.44	0933	5.75	10.3	22.0	32.7	6.54	98	12.92	100
	[1 gal. = 3.785 L]	0938	5.74	10.3	22.0	146.0	5.55	61	12.92	100
		0943	5.70	10.3	22.1	268.0	4.99	57	12.92	100
PID Reading (ppm): 0		0948								
		1016	5.67	10.3	22.9	426.0	5.92	48	12.92	100
		1019	5.67	10.3	22.8	457.0	5.23	69	12.92	100
Well Casing Diameter: 2"		1022	5.67	10.2	22.7	473.0	4.95	67	12.92	100
Total Well Depth: 35'		1025	5.67	10.2	22.7	477.0	4.82	67	12.92	100
Static Water Level: 12.93'		1035	5.70	9.9	22.8	280.0	4.68	57	12.92	100
Tube Intake Depth: 33'		1038	5.69	9.9	22.7	300.0	4.60	53	12.92	100
		1041	5.68	10.0	22.6	319.0	4.58	52	12.92	100
Start Purge (hr): 0847										
End Purge (hr): 1043										
Total Purge Time (min): 116										
Total Vol. Purged:										
Sample		Color	pH	S.C.	Temp	Turb	DO	ORP	DTW	Flowrate
4/17/00										
1045		brown	5.68	10.0	22.6	319.0	4.58	52	12.92	100

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 4/17/00									
Time: 1030	brown	5.67	10.2	22.7	477	4.82	67	12.92	100

cm 4/17/00

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments: 0943 water is cloudy amber color / 0945 turn pump off turbidity keeps increasing

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[ ] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD: N/A
Duplicate ID No.: N/A

Signature(s): Chris Marin

Comments: 1015 begin purging OLD-36-12 / 1025 check tubing / tubing slipped to bottom of well / adjust the reg

Date 4/16/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos.: 9272023

SA36
Sample Location: OLD-36-13
Sample ID No.: NTC 36001 3D10
Sampled By: BK
C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	1740	4.89	22.2	22.21	6.54	2.68	30	13.00	~100
1	0.041	0.155	1750	4.87	29.1	22.18	5.95	2.05	20	12.94	~100
2	0.163	0.617	1800	4.84	21.7	22.25	5.32	1.60	14	12.94	~100
4	0.653	2.47	1810	4.89	21.8	22.33	6.13	1.29	7	12.94	~100
6	1.469	5.56	1815	4.88	21.9	22.32	5.51	1.24	7	12.94	~100
8	2.611	9.88	1820	4.89	21.9	22.25	5.54	1.17	5	12.94	~100
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): 0

Well Casing Diameter: 2"
Total Well Depth: 65'
Static Water Level: 12.94
Tube Intake Depth: 63'

Start Purge (hr): 1720
End Purge (hr): 1820
Total Purge Time (min): 60
Total Vol. Purged: NA

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 041600									
Time: 1825	clear	4.89	21.9	22.29	5.56	1.13	3	12.94	~100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments:
Duplicate sample collected

Method:
[ ] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.: NTC 36 1406 D

Signature(s): Robert L. Knight

Groundwater Purging and Sampling Log

Tetra Tech NUS

Date 041600

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: SA36 14D10

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC 36614D10

[X] Monitoring Well Data

Serial Nos.: 987 2043

Sampled By: BRB

[ ] Other Well Type:

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	1525	6.55	37	28.8	158	1.99	39	13.71	100
1	0.041 / 0.155	1535	6.54	39	28.9	170	1.49	31	13.71	100
2	0.163 / 0.617	1545	6.53	41	28.9	189	0.59	14	13.71	100
4	0.653 / 2.47	1555	6.52	41	28.9	195	0.25	2	13.71	100
6	1.469 / 5.56	1605	6.51	42	28.7	199	0.00	-10	13.71	100
8	2.611 / 9.88	1615	6.48	42	28.3	201	0.00	-22	13.71	100
10	4.08 / 15.44	1625	6.42	41	27.5	195	0.00	-29	13.72	100
	[1 gal. = 3.785 L]	1630	6.41	41	27.6	189	0.00	-29	13.73	100
		1635	6.40	40	27.6	186	0.00	-29	13.74	100
PID Reading (ppm): 0		1640	6.38	40	27.5	185	0.00	-30	13.74	100
		1645	6.38	40	27.5	182	0.00	-30	13.74	100

Well Casing Diameter: 2"
Total Well Depth: 65.0
Static Water Level: 13.49
Tube Intake Depth: 62.5

Start Purge (hr): 1515
End Purge (hr): 1645
Total Purge Time (min): 90
Total Vol. Purged: ~2.5 gal

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 041600									
Time: 1650	Brownish	6.38	40	27.5	182	0.00	-30	13.74	N/A

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	X
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD: N/A

Duplicate ID No.: N/A

Signature(s):

Date 4/18/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

SN36
Sample Location: OLD-36-15A

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos.: 927097

Sample ID No.: NTC36G15A10

Sampled By: BK

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	0923	5.85	8.0	24.3	74.5	4.84	174	12.34	100
1	0.041	0.155	0933	5.85	8.0	24.3	76.6	4.64	166	12.34	100
2	0.163	0.617	0943	5.84	8.0	24.4	81.7	4.61	165		100
4	0.653	2.47	~~0952~~ 0953	5.84	8.0	24.4	83.3	4.45	160		100
6	1.469	5.56	1003	5.84	8.0	24.5	81.1	3.98	155		100
8	2.611	9.88	1013	5.85	8.0	24.5	80.5	3.96	155		100
10	4.08	15.44	1023	5.85	8.0	24.6	79.5	3.96	154		100
	[1 gal. = 3.785 L]		1033	5.84	8.0	24.6	78.2	3.93	152		100
			1043	5.85	8.0	24.7	77.3	3.93	152		100
PID Reading (ppm): 0			1048	5.85	8.0	24.7	76.2	3.88	151		100
			1052	5.86	8.0	24.8	76.0	3.87	151		100
			1102	5.86	8.0	24.8	74.3	3.86	151		100

Well Casing Diameter: 2"
Total Well Depth: 19.61'
Static Water Level: 12.33'
Tube Intake Depth: 15.50'

Start Purge (hr): 0948
End Purge (hr): 1104
Total Purge Time (min): 124
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 4/18/00 Time: 1107	brown	5.86	8.0	24.8	74.3	3.86	151	12.34	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	✓
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	
Antimony	6010B	HNO_3	1	0.5-liter	HDPE	✓

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD: N/A

Duplicate ID No.: N/A

Signature(s): Chris Main

[redacted]

Chain of Custody Record

Quanterra

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
ETTA Tech NUS INC.	Mike Campbell	041700	56196
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	
800 OAK RIDGE TURNPIKE STE A600	(865) 483-9900 (865) 483-2014	NORTHCANTON	Page 1 of 1
City / **State** / **Zip Code**	**Site Contact**		
OAK RIDGE / TN / 37830			
Project Name	**Carrier/Waybill Number**		
NTC ORLANDO 7457	FEDEX 815276815396		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: 8260B Full Lists	Analysis: Antimony
NTCTB 365 0416	041600	1600	GW	90 ml	[illegible]	2	HCL		X	
NTC 36G 02B 10	↓	1630		[illegible] ml	↓	3	↓		X	
NTC 36G 06A 10		1630				3			X	
NTC 36G 14D 10		1650				3			X	
NTC 36G 07A 10		1655				3			X	
NTC 36G 02A 10		1815				3			X	
NTC 36G 013 D 10		1825				3			X	
NTC 36 14 06		0000				3			X	
NTC 36G 09 10	↓	1840				3			X	
NTC 36G 11C 10	041700	0945				3			X	
NTC 36G 11C 10 MS/MSD		0955				3			X	
NTC 36G 12C 10		1045				3			X	
NTC 36G 013 10		1015		↓	↓	3	↓		X	
NTC 36G 01A 10		1050		[illegible] ml	[illegible]	4	HCL [illegible]		X	X
	↓		↓							

Special Instructions
7-DAY TURNAROUND ON ANALYSIS / FAX RESULTS ASAP

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required
☐ Normal ☒ Rush 7 DAY TURNAROUND

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

1. Relinquished By	Date	Time	1. Received By	Date	Time
[signature]	041700	1730	FEDEX	041700	
2. Relinquished By	**Date**	**Time**	**2. Received By**	**Date**	**Time**
3. Relinquished By	**Date**	**Time**	**3. Received By**	**Date**	**Time**

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
TETRA TECH NUS	MIKE CAMPBELL	041700	58224
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 4**
800 OAK RIDGE TURNPIKE	(865) 483-9900		
City / **State** / **Zip Code**	**Site Contact**		
OAK RIDGE / TN / 37830			
Project Name	**Carrier/Waybill Number**		
NTC ORLANDO	FEDEX 815276815396		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	TRPH	Hg (7471A)	Ba (6010B)	As (6010B)	Se (6010B)	Pb (6010B)
NTC36S01001	4-16-00	0840	SOIL	GLASS	4 OZ	1	NONE			X				
01101		0856				1				X				
01201		0911				1				X				
01301		0934				1				X				
01401		0951				1				X				
01501		1004				1					X			
01601		1024				1					X			
01701		1036				1			X					
01801		1100				1			X					
01901		1122				1			X					
02001		1142				1			X					
02101		1305				1						X	X	
02201	1315	~~1320~~ 1311				1						X	X	
02301	1320	~~1330~~ 1311				1						X	X	
02401	1330	~~1329~~ 1311				1						X	X	
02501		1339				1						X	X	

Analysis

Special Instructions

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required: ☐ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

1. Relinquished By	Date	Time	1. Received By	Date	Time
G.A. Cisco	4-17-00	1730			
2. Relinquished By	**Date**	**Time**	**2. Received By**	**Date**	**Time**
3. Relinquished By	**Date**	**Time**	**3. Received By**	**Date**	**Time**

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

[redacted]

Chain of Custody Record

Quanterra

QUA-4124

Client: TETRA TECH NUS	Project Manager	Date: 041700	Chain Of Custody Number: 53539
Address	Telephone Number (Area Code)/Fax Number	Lab Number	Page 2 of 4
City / State / Zip Code	Site Contact		
Project Name: NTC ORLANDO	Carrier/Waybill Number: FEDEX 815276815396		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	TRPH - FL-PRO		As (6010B)	Sb (6010B)		Pb (6010B)							
NTC36S02601	4-16-00	1348	SOIL		4 OZ	1	NONE				X	X									
02701	"	1359				1					X	X									
02801	"	1412				1					X	X									
02901	"	1433				1					X	X									
03001	"	1350				1					X	X									
03101	4-17-00	0846				2			X		X	X									
03201	"	0905				1					X	X									
03301	"	0923				1					X	X									
03401	"	0940				1					X	X									
03501	"	0739				1					X	X									
03601	"	0950				1					X	X									
03701	"	1005				3		MS/MSD			X	X									
NTC36D1001	—	—				1			X												
NTC36D1002	—	—				1					X	X									

Analysis

Special Instructions

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required: ☐ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time		Date	Time
1. Relinquished By: D. J. Lisco	4-17-00	1730	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NTC Orlando
Project No.: 7457
Location: Orlando, FL
Personnel: C. Morrison + D. Starr
Weather Conditions: sunny
Measuring Device: Water Level Indicator
Tidally Influenced: Yes ___ No X
Remarks:

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
OLD-36-01A	8/22/00	1046			9.10			
OLD-36-02A		0952			9.00			
OLD-36-06A		1003			9.11			
OLD-36-07A		1014			9.00			
OLD-36-08B		1020			11.50			
OLD-36-09C		1036			13.55			
OLD-36-10B		1057			9.53			
OLD-36-11C		1055			13.05			
OLD-36-12C		1059			~~12.08~~ 12.78			
OLD-36-13D		1040			13.05			
OLD-36-15A		1120		17.61	12.49			
OLD-36-16A		1107			9.12			
OLD-36-17B		1109			9.31			
OLD-36-18C		1111			13.56			
OLD-36-19A		1120		19.86	12.30			
OLD-36-20B		1122		27.13	12.74			
OLD-36-21C		1124		37.55	15.85			
OLD-36-22B		1113		27.50	12.87			
OLD-36-23C		1115		37.30	16.17			
OLD-36-24B		0934			9.05			
OLD-36-25C	✓	0936			14.11			
OLD-36-14D		0947			13.55			

Date 8/24/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-16A

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC 36-16A11

[X] Monitoring Well Data

Serial Nos.: 9612039

Sampled By: Mark Hawes + Cher Morrison

[ ] Other Well Type:

C-O-C No.: 44748

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	1131	5.64	0.158	30.7	7.9	1.61	127	9.10	100
1	0.041	0.155	1136	5.63	0.159	30.8	6.9	1.33	128	9.10	100
2	0.163	0.617	1141	5.62	0.153	30.9	7.0	1.33	129	9.10	100
4	0.653	2.47	1146	5.62	0.155	30.6	7.0	1.20	133	9.10	100
6	1.469	5.56	1151	5.62	0.156	30.6	6.3	1.12	133	9.10	100
8	2.611	9.88	1154	5.62	0.154	30.6	6.7	1.12	132	9.10	100
10	4.08	15.44									
	[1 gal. = 3.785 L]										

PID Reading (ppm): 0

Well Casing Diameter: 2"
Total Well Depth: 17.35'
Static Water Level: 9.10'
Tube Intake Depth: 13.00'

Start Purge (hr): 1119
End Purge (hr): 1154
Total Purge Time (min): 35
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/00									
Time: 1157	Clear	5.62	0.154	30.6	6.7	1.12	132	9.10	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
✓ TCL VOCs	8260B	HCl	3	40 ml	glass vials	3
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
- [X] Peristaltic Pump
- [ ] Centrifugal Pump
- [ ] Bladder Pump
- [X] Tube Evacuation
- [ ] Vacuum Jug Assembly
- [ ] Bailer

Tubing Type:
- [ ] Polyethylene
- [X] Teflon
- [ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): Cher Morrison

Date 8/24/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-17B

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC 36G 17B11

[X] Monitoring Well Data

Serial Nos.: 9012039

Sampled By: Mark Hawes + Cher Morris

[ ] Other Well Type:

C-O-C No.: 44740

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	1021	5.69	0.194	29.65	350	2.52	105	6.29	100
1	0.041 / 0.155	1026	5.68	0.193	29.71	400	1.97	99	9.66	100
2	0.163 / 0.617	1031	5.68	0.188	29.77	~~3.70~~	1.80	96	9.66	100
4	0.653 / 2.47	1036	5.61	0.179	29.91	340	1.63	92	9.66	100
6	1.469 / 5.56	1043	5.69	0.178	29.85	280	1.30	91	9.66	100
8	2.611 / 9.88	1046	5.51	0.163	29.64	260	1.15	89	9.68	100
10	4.08 / 15.44	1052	5.54	0.162	29.73	280	0.93	83	9.68	100
	[1 gal. = 3.785 L]	1057	5.54	0.167	29.87	290	0.91	76	9.68	100
		1102	5.54	0.168	29.87	290	0.85	72	9.68	100
PID Reading (ppm): 0		1107	5.54	0.169	29.67	290	0.85	68	9.68	100

Time 1041 → 9.29 ; 1052 → 3.70N

Well Casing Diameter: 2"
Total Well Depth: 24.29'
Static Water Level: ~~6.29'~~
Tube Intake Depth: 22.29'

Start Purge (hr): 1011
End Purge (hr): 1107
Total Purge Time (min): 56
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/00									
Time: 1111	Gray	5.54	0.169	29.7	290	0.85	68	9.68	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	3
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
- [X] Peristaltic Pump
- [ ] Centrifugal Pump
- [ ] Bladder Pump
- [X] Tube Evacuation
- [ ] Vacuum Jug Assembly
- [ ] Bailer

Tubing Type:
- [ ] Polyethylene
- [X] Teflon
- [X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): [signature]

Date 8/24/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-18C

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC36C18C11

[X] Monitoring Well Data

Serial Nos.: 9292067

Sampled By: Mark Hawes & Chet Morris

[ ] Other Well Type:

C-O-C No.: 41742

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	1015	6.09	0.194	29.28	>1000	4.79	-114	13.55	~~100~~ 100
1	0.041 / 0.155	1024	6.08	0.194	29.22	71000	4.41	-122	13.56	100
2	0.163 / 0.617	1029	6.09	0.193	29.24	>1000	4.23	-128	13.56	100
4	0.653 / 2.47	1034	6.07	0.189	29.15	71000	4.44	-122	13.56	100
6	1.469 / 5.56	1039	6.07	0.188	29.30	71000	4.15	-128	13.56	100
8	2.611 / 9.88	1045	6.07	0.188	29.19	71000	4.03	-136	13.56	100
10	4.08 / 15.44	~~1051~~ 1051	6.06	0.187	29.39	71000	5.08	-134	13.56	100
	[1 gal. = 3.785 L]	1056	6.06	0.186	29.62	71000	4.62	-133	13.56	100
		1100	6.05	0.186	29.48	71000	4.20	-133	13.56	100
PID Reading (ppm): 0		1105	6.05	0.184	29.37	71000	4.05	-133	13.56	100
		1109	6.05	0.184	29.59	71000	3.97	-133	13.56	100
		1117	6.05	0.183	29.62	71000	3.86	-133	13.56	100

Well Casing Diameter: 2"
Total Well Depth: 34.61'
Static Water Level: 13.55'
Tube Intake Depth: 32.61'

Start Purge (hr): 1009
End Purge (hr): 1117
Total Purge Time (min): 68
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/00									
Time: 1122	clear gray	6.05	0.183	29.62	71000	3.86	-133	13.56	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	3
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[X] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[X] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s):

Date 8/24/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-19A

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC 36 G 19A 11

[X] Monitoring Well Data

Serial Nos.: 9292067

Sampled By: Cher Morrison

[ ] Other Well Type:

C-O-C No.: 44748

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	1712	5.76	0.075	31.69	19.4	2.57	84	12.29	100
1	0.041	0.155	1717	5.68	0.076	31.68	18.5	2.29	78	12.29	100
2	0.163	0.617	1722	5.66	0.077	32.15	18.6	2.23	78	12.29	100
4	0.653	2.47	1727	5.69	0.078	32.39	19.0	2.64	76	12.29	100
6	1.469	5.56	~~1732~~ 1734	5.70	0.075	31.46	16.7	3.03	80	12.29	100
8	2.611	9.88	~~1737~~ 1737	5.69	0.075	31.60	16.6	3.20	85	12.29	100
10	4.08	15.44	~~1742~~ 1742	5.68	0.075	31.50	16.8	3.51	88	12.29	100
	[1 gal. = 3.785 L]		~~1747~~ 1747	5.69	0.076	31.57	17.3	3.05	91	12.29	100
			1752	5.68	0.075	31.37	16.2	2.80	93	12.29	100
PID Reading (ppm): 0			1757	5.69	0.076	31.57	16.6	1.85	89	12.29	100
			1802	5.68	0.076	31.91	16.7	2.00	89	12.29	100

Well Casing Diameter: 2"
Total Well Depth: 19.86'
Static Water Level: 12.26'
Tube Intake Depth: 16.0'

Start Purge (hr): 1705
End Purge (hr): 1802
Total Purge Time (min): 57
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/00 Time: 1805	Clear	5.68	0.076	31.9	16.7	2.00	89	12.29	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	3
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[X] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): Cher Morrison

Date 8/24/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-26-20B

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos.: 9292 0607

Sample ID No.: NTC 3602OB11

Sampled By: Cher Morrison & Mark Haynes

C-O-C No.: 44748

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	1611	5.16	0.068	31.02	8.68	1.90	123	12.95	90
1	0.041 / 0.155	1616	5.17	0.070	31.32	8.59	1.63	127	12.95	90
2	0.163 / 0.617	1621	5.12	0.072	30.91	7.99	2.16	127	12.95	90
4	0.653 / 2.47	1626	5.08	0.079	30.69	7.38	1.56	126	12.97	90
6	1.469 / 5.56	1631	5.07	0.081	30.68	6.41	1.24	124	12.97	90
8	2.611 / 9.88	1636	5.06	0.082	30.73	5.88	1.04	124	12.97	90
10	4.08 / 15.44	1641	5.06	0.081	30.75	6.90	1.02	124	12.97	90
	[1 gal. = 3.785 L]	1646	5.06	0.080	30.86	6.49	1.00	124	12.97	90
		1651	5.06	0.080	30.72	6.22	0.98	124	12.97	90

PID Reading (ppm): 0

Well Casing Diameter: 2"
Total Well Depth: 27.13'
Static Water Level: 12.72'
Tube Intake Depth: 25.13'

Start Purge (hr): 1603
End Purge (hr): 1651
Total Purge Time (min): 48
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/00									
Time: 1654	Clear	5.06	0.080	30.7	6.22	0.98	124	12.97	90

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	3
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[X] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): Cher Morrison

Date 8/24/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-30-21C

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC30021C11

[X] Monitoring Well Data

Serial Nos.: 9012039

Sampled By: Cher Morrison, mark Hawes

[ ] Other Well Type: _____

C-O-C No.: 44748

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	1608	6.13	0.198	31.03	789	3.23	-14	15.84	100
1	0.041 / 0.155	1613	6.12	0.199	30.86	862	1.86	-16	15.84	100
2	0.163 / 0.617	1618	6.13	0.198	30.34	>1000	1.67	-23	15.84	100
4	0.653 / 2.47	1623	6.10	0.198	30.20	71000	1.40	-20	15.84	100
6	1.469 / 5.56	1628	6.09	0.193	30.01	984	1.37	-10	15.84	100
8	2.611 / 9.88	1633	6.06	0.194	30.09	951	1.06	-12	15.84	100
10	4.08 / 15.44	1639	6.03	0.189	30.09	906	0.87	-13	15.84	100
	[1 gal. = 3.785 L]	1643	6.01	0.187	30.04	865	0.78	-14	15.84	100
		1648	6.00	0.185	30.12	836	0.94	-5	15.84	100
PID Reading (ppm): 0		1653	6.00	0.183	30.11	792	0.87	-11	15.84	100
		1658	5.98	0.181	30.21	772	0.96	-10	15.84	100
		1703	5.99	0.180	30.66	756	0.95	-11	15.84	100

Well Casing Diameter: 2"
Total Well Depth: 37.55
Static Water Level: 15.83
Tube Intake Depth: 35.55

Start Purge (hr): 1600
End Purge (hr): 1703
Total Purge Time (min): 63
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/00									
Time: 1707	cloudy	5.99	0.180	30.7	756	0.95	-11	15.84	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	3
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[X] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): Cher Morrison

Date 8/24/04

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-22B

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos.: 9612 0629

Sample ID No.: NTC36G22B11

Sampled By: Mark Hawes + Chris Morris

C-O-C No.: 44748

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	1416	6.04	0.121	29.77	45.6	3.16	-15	12.94	100
1	0.041 / 0.155	1421	6.01	0.128	29.52	34.4	2.09	-19	12.94	100
2	0.163 / 0.617	1426	6.00	0.127	29.43	32.8	1.84	-20	12.94	100
4	0.653 / 2.47	1431	6.03	0.125	29.87	32.3	1.08	-25	12.94	100
6	1.469 / 5.56	1436	6.00	0.125	29.71	29.7	1.76	-25	12.94	100
8	2.611 / 9.88	1441	5.97	0.125	29.94	27.5	1.26	-26	12.94	100
10	4.08 / 15.44	1446	5.96	0.125	29.69	26.6	1.11	-27	12.94	100
	[1 gal. = 3.785 L]	1451	5.96	0.124	29.58	27.3	1.06	-29	12.94	100
		1456	5.96	0.124	29.76	26.2	1.05	-30	12.94	100
1501 PID Reading (ppm):	0	14	5.93	0.124	29.49	25.7	1.03	-32	12.94	100
		1506	5.94	0.124	29.40	25.3	0.90	-34	12.94	100
		1525								100 — MH

Well Casing Diameter: 2"
Total Well Depth: 27.56'
Static Water Level: 12.81'
Tube Intake Depth: 25.56'

Start Purge (hr): 1406
End Purge (hr): 1506
Total Purge Time (min): 60
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/04									
Time: 1509	lt yellow	5.94	0.124	29.4	25.3	0.90	-34	12.94	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	9
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:
6 - 40mL (MS/MSD) collected
3 - Environmental Sample

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[X] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD: NTC36G22B11 (MS/MSD)

Duplicate ID No.:

Signature(s): Chris Morris

Date 8/24/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Page 1 of 1

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-23C
Sample ID No.: ~~OLD~~ NTC36-23C11 (cm 8/24/00)

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos.: 9292066

Sampled By: Mark Hawes & Chris Morris
C-O-C No.: 44748

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	1424	6.12	0.226	28.92	71000	4.65	-140	16.25	100
1	0.041	0.155	1429	6.11	0.229	29.41	71000	3.68	-151	16.25	100
2	0.163	0.617	1434	6.09	0.226	29.61	71000	3.24	-157	16.25	100
4	0.653	2.47	1439	6.09	0.227	29.85	>1000	2.81	-163	16.25	100
6	1.469	5.56	1444	6.09	0.227	29.77	71000	3.02	-163	16.25	100
8	2.611	9.88	1449	6.08	0.227	29.73	71000	3.84	-165	16.25	100
10	4.08	15.44	1454	6.11	0.226	29.62	71000	0.64	-169	16.25	100
	[1 gal. = 3.785 L]		1459	6.11	0.229	29.36	71000	0.42	-169	16.25	100
1504			~~1464~~	6.11	0.227	29.21	71000	0.27	-168	16.25	100
PID Reading (ppm): 0			1525	6.12	0.229	29.63	>1000	0.44	-171	16.25	100

Well Casing Diameter: 2"
Total Well Depth: 37.30'
Static Water Level: 16.14'
Tube Intake Depth: 35.30'
cm 8/24/00
1410 Start Purge (hr): ~~1409~~
End Purge (hr): 1525
Total Purge Time (min): 69
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/00									
Time: 1529	cloudy gray	6.12	0.229	29.16	71000	0.44	-171	16.25	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
✓ TCL VOCs	8260B	HCl	3	40 ml	glass vials	3
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[X] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): [illegible]

Date 8/24/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-24B

[ ] Domestic Well Data

Flow-Thru Cell
Make\Model: HORIBA U-22

Sample ID No.: NTC36G24B11

[X] Monitoring Well Data

Serial Nos.: 92920607

Sampled By: Mark Hawes + Chris Morrison

[ ] Other Well Type:

C-O-C No.: 44748

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	0801	5.31	0.122	29.44	110	2.12	-108	9.70	100
1	0.041 / 0.155	0809	5.32	0.117	29.49	120	4.87	-111	9.70	100
2	0.163 / 0.617	0814	5.32	0.118	29.60	100	3.83	-111	9.70	100
4	0.653 / 2.47	0819	5.30	0.107	29.67	85	4.17	-115	9.70	100
6	1.469 / 5.56	0825	5.29	0.104	29.75	85	5.43	-114	9.70	100
8	2.611 / 9.88	0834	5.27	0.098	29.76	95	6.40	-117	9.70	100
10	4.08 / 15.44	0840	5.27	0.097	29.81	90	6.90	-118	9.70	100
	[1 gal. = 3.785 L]	0847	5.25	0.096	29.90	80	6.94	-117	9.70	100
		0852	5.25	0.095	29.84	70	6.21	-113	9.70	100

PID Reading (ppm): 0

Well Casing Diameter: 2"
Total Well Depth: 24.27
Static Water Level: 9.64
Tube Intake Depth: 22.27

Start Purge (hr): 0754
End Purge (hr): 0852
Total Purge Time (min): 58
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/00									
Time: 0857	Amber	5.25	0.095	29.84	70	6.21	-113	9.70	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
✓ TCL VOCs	8260B	HCl	3	40 ml	glass vials	3
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[ ] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.: NTC36G1000

Signature(s): Mark Hawes, Chris Morrison

Date 8/24/00

Groundwater Purging and Sampling Log

Tetra Tech NUS

Project Site Name: NTC Orlando
Project No.: 7457/

Sample Location: OLD-36-25C

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell
Make\Model: HORIBA U-22
Serial Nos.: 9012039

Sample ID No.: NTC36B25C11

Sampled By: Mark Hawes + Cher Morrison

C-O-C No.: 44748

PURGING DATA

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	~~0800~~	5.							
1	0.041	0.155	0805	5.49	0.139	28.44	110	1.64	30	14.12	100
2	0.163	0.617	0811	5.50	0.134	28.71	85	2.09	32	14.11	100
4	0.653	2.47	0816	5.48	0.133	29.02	60	2.16	33	14.11	100
6	1.469	5.56	0821	5.47	0.130	29.11	45	2.25	33	14.11	100
8	2.611	9.88	0827	5.46	0.123	29.18	37	1.00	31	14.11	100
10	4.08	15.44	0836	5.47	0.118	29.14	26	0.96	32	14.11	100
	[1 gal. = 3.785 L]		0841	5.42	0.113	29.26	21	0.95	31	14.11	100
			0849	5.41	0.112	29.80	20	0.95	31	14.11	100
PID Reading (ppm): 0			0854	5.41	0.112	29.83	18	0.88	30	14.11	100
			0900	5.41	0.111	29.86	18	0.85	28	14.11	100

8/24/00 Cm

Well Casing Diameter: 2"
Total Well Depth: 34.89
Static Water Level: 14.11
Tube Intake Depth: 32.89

Start Purge (hr): 0756
End Purge (hr): 0900
Total Purge Time (min): 64
Total Vol. Purged:

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 8/24/00									
Time: 0911	Clear	5.41	0.111	29.86	18	0.85	28	14.11	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
✓ TCL VOCs	8260B	HCl	3	40 ml	glass vials	6
SVOCs/PAHs	8270C/8310	None	2	1-liter	amber glass	
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	

ADDITIONAL INFORMATION

Comments:
Duplicate taken

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[X] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[X] Teflon
[ ] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.: NTC36D100

Signature(s): Mark Hawes, Cher Morrison

[redacted]

Chain of Custody Record

Quanterra

QUA-4124 0797

Client	Project Manager	Date	Chain of Custody Number
Tetra Tech NUS	Mike Gumbrell	8/24/00	14748
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
800 Oak Ridge Turnpike Ste A-600	865-483-9900		
City / State / Zip Code	**Site Contact**	**Lab Contact**	
Oak Ridge / TN / 37830		Dave Heakin	
Project Name	**Carrier/Waybill Number**		
NTC Orlando	FEDEX: 8211475 7001		
Contract/Purchase Order/Quote No.			
7457			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Aqueous	Sed.	Soil		Containers & Preservatives: Unpres.	H2SO4	HNOS	HCl	NaOH	ZnAc/NaOH		Analysis (Attach list if more space is needed): VOC	Special Instructions/ Conditions of Receipt
NTC36G24B11	8/24/00	0857	X							X				3	
NTC36G25C11		0911	X							X				3	
NTC36D1000		0911	X							X				3	
NTC36G17B11		1111	X							X				3	
NTC36G18C11		1122	X							X				3	
NTC36G16A11		1157	X							X				3	
NTC36G22B11 (MS/MSD)		1509	X							X				9	
NTC36G23C11		1528	X							X				3	
NTC36G20B11		1654	X							X				3	
NTC36G21C11		1707	X							X				3	
NTC36G19A11		1805	X							X				3	
NTC36T1000	↓	0857	X							X				3	

Possible Hazard Identification

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☒ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other_____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: [signature]	8/24/00	1900	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

APPENDIX C

SITE INVESTIGATION ANALYTICAL DATA

APPENDIX C-1

VALIDATED SOIL ANALYTICAL DATA

TABLE C-1

VALIDATED SOIL ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	Florida SCTL[a] mg/L	BGSV[b] mg/L	S010	S011	S012	S013	S014	S015
Sample Number			NTC36S01001	NTC36S01101	NTC36S01201	NTC36S01301	NTC36S01401	NTC36S01501
Sample Date			4/16/2000	4/16/2000	4/16/2000	4/16/2000	4/16/2000	4/16/2000
Inorganics (mg/kg)								
Antimony	26		NA	NA	NA	NA	NA	NA
Arsenic	0.8	1	NA	NA	NA	NA	NA	NA
Barium	110	8.7	NA	NA	NA	NA	NA	18.2
Mercury	3.4	0.1	0.018 U	0.015 U	0.014 U	0.015 U	0.007 U	NA
Petroleum Hydrocarbons (mg/kg)								
TRPH (C8-C40)	340		NA	NA	NA	NA	NA	NA

TABLE C-1

VALIDATED SOIL ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	Florida SCTL[a] mg/L	BGSV[b] mg/L	S016	S017	S018	S019	S020	
Sample Number			NTC36S01601	NTC36S01701	NTC36S01801	NTC36S01901	NTC36S02001	NTC36S02001-D
Sample Date			4/16/2000	4/16/2000	4/16/2000	4/16/2000	4/16/2000	4/17/2000
Inorganics (mg/kg)								
Antimony	26		NA	NA	NA	NA	NA	NA
Arsenic	0.8	1	NA	NA	NA	NA	NA	NA
Barium	110	8.7	109	NA	NA	NA	NA	NA
Mercury	3.4	0.1	NA	NA	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)								
TRPH (C8-C40)	340		NA	35 J	13 J	140 J	130 J	180 J

TABLE C-1

VALIDATED SOIL ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	Florida SCTL[a] mg/L	BGSV[b] mg/L	S021	S022	S023	S024	S025	S026
Sample Number			NTC36S02101	NTC36S02201	NTC36S02301	NTC36S02401	NTC36S02501	NTC36S02601
Sample Date			4/16/2000	4/16/2000	4/16/2000	4/16/2000	4/16/2000	4/16/2000
Inorganics (mg/kg)								
Antimony	26		0.17 U	0.17 U	0.17 U	0.16 U	0.16 U	0.17 U
Arsenic	0.8	1	0.55	0.26 U	0.26 U	0.26 U	0.39	0.27
Barium	110	8.7	NA	NA	NA	NA	NA	NA
Mercury	3.4	0.1	NA	NA	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)								
TRPH (C8-C40)	340		NA	NA	NA	NA	NA	NA

TABLE C-1

VALIDATED SOIL ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	Florida SCTL[a] mg/L	BGSV[b] mg/L	S027	S028	S029	S030		S031
Sample Number			NTC36S02701	NTC36S02801	NTC36S02901	NTC36S03001	NTC36S03001-D	NTC36S03101
Sample Date			4/16/2000	4/16/2000	4/16/2000	4/16/2000	4/17/2000	4/17/2000
Inorganics (mg/kg)								
Antimony	26		0.17 U	0.17 U	0.17 U	0.17 U	0.16 U	0.17 U
Arsenic	0.8	1	0.26 U	0.81	0.76	0.26 U	0.26 U	0.67
Barium	110	8.7	NA	NA	NA	NA	NA	NA
Mercury	3.4	0.1	NA	NA	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)								
TRPH (C8-C40)	340		NA	NA	NA	NA	NA	170 J

TABLE C-1

VALIDATED SOIL ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	Florida SCTL[a] mg/L	BGSV[b] mg/L	S032	S033	S034	S035	S036	S037
Sample Number			NTC36S03201	NTC36S03301	NTC36S03401	NTC36S03501	NTC36S03601	NTC36S03701
Sample Date			4/17/2000	4/17/2000	4/17/2000	4/17/2000	4/17/2000	4/17/2000
Inorganics (mg/kg)								
Antimony	26		0.17 U	0.17 U	0.17 U	0.16 U	0.22	0.21
Arsenic	0.8	1	0.31	0.26 U	0.27 U	0.26 U	0.46	0.25 U
Barium	110	8.7	NA	NA	NA	NA	NA	NA
Mercury	3.4	0.1	NA	NA	NA	NA	NA	NA
Petroleum Hydrocarbons (mg/kg)								
TRPH (C8-C40)	340		NA	NA	NA	NA	NA	NA

Notes:

[a] Soil Cleanup Target Level [Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999].

[b] Background Screening Valuefor inorganics only (ABB-ES, 1995).

NA Not analyzed.

"U" qualifier indicates that the analyte/compound was analyzed for but was not detected above the reported sample quantitation limit

"J" qualifier indicates that the analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample.

APPENDIX C-2

VALIDATED GROUNDWATER ANALYTICAL DATA

TABLE C-2

VALIDATED GROUNDWATER ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Identification Number	CAS No.	Screening Criteria[a] Florida GCTL[b] (µg/L)	BGSV[c] (µg/L)	OLD-36-01A	OLD-36-02A	OLD-36-06A	OLD-36-07A	OLD-36-08B
Sample Number				NTC36G01A10	NTC36G02A10	NTC36G06A10	NTC36G07A10	NTC36G08B10
Sample Date				4/17/2000	4/16/2000	4/16/2000	4/16/2000	4/16/2000
Volatiles (ug/L)								
1,1,1,2-Tetrachloroethane	630-20-6	1.2		NA	NA	NA	NA	NA
1,1,1-Trichloroethane	71-55-6	200		1 U	1 U	1 U	1.7 U	1.7 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2		1 U	1 U	1 U	1.7 U	1.7 U
1,1,2-Trichloroethane	79-00-5	5		1 U	1 U	1 U	1.7 U	1.7 U
1,1-Dichloroethane	75-34-3	70		1 U	1 U	1 U	1.7 U	1.7 U
1,1-Dichloroethene	75-35-4	7		1 U	1 U	1 U	1.7 U	1.7 U
1,1-Dichloropropene	563-58-6			NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	87-61-6	70		NA	NA	NA	NA	NA
1,2,3-Trichloropropane	96-18-4	0.2		NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	70		NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	95-63-6	10		NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	96-12-8	0.2		NA	NA	NA	NA	NA
1,2-Dibromoethane	106-93-4	0.02		NA	NA	NA	NA	NA
1,2-Dichlorobenzene	95-50-1	600		NA	NA	NA	NA	NA
1,2-Dichloroethane	107-06-2	3		1 U	1 U	1 U	1.7 U	1.7 U
1,2-Dichloropropane	78-87-5	5		1 U	1 U	1 U	1.7 U	1.7 U
1,3,5-Trimethylbenzene	108-67-8	10		NA	NA	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	10		NA	NA	NA	NA	NA
1,3-Dichloropropane	142-28-9			NA	NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	75		NA	NA	NA	NA	NA
1-Chlorohexane	544-10-5			NA	NA	NA	NA	NA
2,2-Dichloropropane	594-20-7			NA	NA	NA	NA	NA
2-Butanone	78-93-3	4200		10 UR	10 UR	10 UR	17 UR	17 UR
2-Chlorotoluene	95-49-8			NA	NA	NA	NA	NA
2-Hexanone	591-78-6	280		10 U	10 U	10 U	17 U	17 U
4-Chlorotoluene	106-43-4			NA	NA	NA	NA	NA
4-Isopropyltoluene	99-87-6			NA	NA	NA	NA	NA
4-Methyl-2-pentanone	108-10-1	560		10 U	10 U	10 U	8.4 U	8.4 U
Acetone	67-64-1	700		10 UR	10 UR	10 UR	17 UR	17 UR
Benzene	71-43-2	1		1 U	1 U	1 U	1.7 U	1.7 U
Bromobenzene	108-86-1			NA	NA	NA	NA	NA
Bromochloromethane	74-97-5	91		NA	NA	NA	NA	NA
Bromodichloromethane	75-27-4	0.6		1 U	1 U	1 U	1.7 U	1.7 U
Bromoform	75-25-2	4.4		1 U	1 U	1 U	1.7 U	1.7 U
Bromomethane	74-83-9	9.8		1 U	1 U	1 U	1.7 U	1.7 U
Carbon Disulfide	75-15-0	700		1 U	1 U	1 U	1.7 U	1.7 U
Carbon tetrachloride	56-23-5	3		1 U	1 U	1 U	1.7 U	1.7 U
Chlorobenzene	108-90-7	100		1 U	1 U	1 U	1.7 U	1.7 U
Chlorodibromomethane	124-48-1	0.4		NA	NA	NA	NA	NA
Chloroethane	75-00-3	12		1 U	1 U	1 U	1.7 U	1.7 U
Chloroform	67-66-3	5.7		1 U	1 U	1 U	1.7 U	1.7 U
Chloromethane	74-87-3	2.7		1 U	1 U	1 U	1.7 U	1.7 U
cis-1,2-Dichloroethene	156-59-2	70		2	1 U	1 U	0.3 J	1.7 U
cis-1,3-Dichloropropene	10061-01-05	0.2		1 U	1 U	1 U	1.7 U	1.7 U
Dibromochloromethane	124-48-1	0.4		1 U	1 U	1 U	1.7 U	1.7 U
Dibromomethane	74-95-3			NA	NA	NA	NA	NA
Dichlorodifluoromethane	75-71-8	1400		NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	30		1 U	1 U	1 U	1.7 U	1.7 U
Hexachlorobutadiene	87-68-3	0.5		NA	NA	NA	NA	NA
Isopropylbenzene	98-82-8	0.8		NA	NA	NA	NA	NA
m+p-Xylenes	1330-20-7			NA	NA	NA	NA	NA
Methylene Chloride	75-09-2	5		1 U	1 U	1 U	1.7 U	1.7 U
N-Butylbenzene	104-51-8			NA	NA	NA	NA	NA
N-Propylbenzene	103-65-1			NA	NA	NA	NA	NA
Naphthalene	91-20-3	20		NA	NA	NA	NA	NA
o-Xylene	95-47-6			NA	NA	NA	NA	NA
sec-Butylbenzene	135-98-8			NA	NA	NA	NA	NA
Styrene	100-42-5	100		1 U	1 U	1 U	1.7 U	1.7 U
tert-Butylbenzene	98-06-6			NA	NA	NA	NA	NA
Tetrachloroethene	127-18-4	3		0.3 J	1 U	0.25 J	1.7 U	1.7 U
Toluene	108-88-3	40		1 U	1 U	1 U	1.7 U	1.7 U
Total xylenes	1330-20-7	20		1 U	1 U	1 U	1.7 U	1.7 U
trans-1,2-Dichloroethene	156-60-5	100		0.16 J	1 U	1 U	1.7 U	1.7 U
trans-1,3-Dichloropropene	10061-02-6	0.2		1 U	1 U	1 U	1.7 U	1.7 U
Trichloroethene	79-01-6	3		0.79 J	1 U	**14**	**34**	**46**
Trichlorofluoromethane	75-69-4	2100		NA	NA	NA	NA	NA
Vinyl chloride	75-01-4	1		1 U	1 U	1 U	1.7 U	1.7 U
Inorganics (ug/L)								
Antimony	7440-36-0	6	4.1	1.6 U	NA	NA	NA	NA

TABLE C-2

VALIDATED GROUNDWATER ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Identification Number	CAS No.	Screening Criteria[a] Florida GCTL[b]	BGSV[c]	OLD-36-09C	OLD-36-10B	OLD-36-11C	OLD-36-12C	OLD-3
Sample Number				NTC36G09C10	NTC36G10B10	NTC36G11C10	NTC36G12C10	NTC36G13D10
Sample Date		(µg/L)	(µg/L)	4/16/2000	4/17/2000	4/17/2000	4/17/2000	4/16/2000
Volatiles (ug/L)								
1,1,1,2-Tetrachloroethane	630-20-6	1.2		NA	NA	NA	NA	NA
1,1,1-Trichloroethane	71-55-6	200		6.2 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2		6.2 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	79-00-5	5		6.2 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	75-34-3	70		6.2 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	75-35-4	7		6.2 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	563-58-6			NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	87-61-6	70		NA	NA	NA	NA	NA
1,2,3-Trichloropropane	96-18-4	0.2		NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	70		NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	95-63-6	10		NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	96-12-8	0.2		NA	NA	NA	NA	NA
1,2-Dibromoethane	106-93-4	0.02		NA	NA	NA	NA	NA
1,2-Dichlorobenzene	95-50-1	600		NA	NA	NA	NA	NA
1,2-Dichloroethane	107-06-2	3		6.2 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	78-87-5	5		6.2 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	10		NA	NA	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	10		NA	NA	NA	NA	NA
1,3-Dichloropropane	142-28-9			NA	NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	75		NA	NA	NA	NA	NA
1-Chlorohexane	544-10-5			NA	NA	NA	NA	NA
2,2-Dichloropropane	594-20-7			NA	NA	NA	NA	NA
2-Butanone	78-93-3	4200		62 UR	10 UR	10 UR	10 UR	10 UR
2-Chlorotoluene	95-49-8			NA	NA	NA	NA	NA
2-Hexanone	591-78-6	280		62 U	10 U	10 U	10 U	10 U
4-Chlorotoluene	106-43-4			NA	NA	NA	NA	NA
4-Isopropyltoluene	99-87-6			NA	NA	NA	NA	NA
4-Methyl-2-pentanone	108-10-1	560		62 U	10 U	10 U	10 U	10 U
Acetone	67-64-1	700		170 J	10 UR	3.9 J	10 UR	10 UR
Benzene	71-43-2	1		6.2 U	0.26 J	0.17 J	0.34 J	1 U
Bromobenzene	108-86-1			NA	NA	NA	NA	NA
Bromochloromethane	74-97-5	91		NA	NA	NA	NA	NA
Bromodichloromethane	75-27-4	0.6		6.2 U	1 U	1 U	1 U	1 U
Bromoform	75-25-2	4.4		6.2 U	1 U	1 U	1 U	1 U
Bromomethane	74-83-9	9.8		6.2 U	1 U	1 U	1 U	1 U
Carbon Disulfide	75-15-0	700		1.8 J	1 U	1 U	1 U	1 U
Carbon tetrachloride	56-23-5	3		6.2 U	1 U	1 U	1 U	1 U
Chlorobenzene	108-90-7	100		6.2 U	1 U	1 U	1 U	1 U
Chlorodibromomethane	124-48-1	0.4		NA	NA	NA	NA	NA
Chloroethane	75-00-3	12		6.2 U	1 U	1 U	1 U	1 U
Chloroform	67-66-3	5.7		6.2 U	1 U	1 U	1 U	1 U
Chloromethane	74-87-3	2.7		6.2 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70		47	8.9	6.6	3.2	1 U
cis-1,3-Dichloropropene	10061-01-05	0.2		6.2 U	1 U	1 U	1 U	1 U
Dibromochloromethane	124-48-1	0.4		6.2 U	1 U	1 U	1 U	1 U
Dibromomethane	74-95-3			NA	NA	NA	NA	NA
Dichlorodifluoromethane	75-71-8	1400		NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	30		6.2 U	1 U	1 U	1 U	1 U
Hexachlorobutadiene	87-68-3	0.5		NA	NA	NA	NA	NA
Isopropylbenzene	98-82-8	0.8		NA	NA	NA	NA	NA
m+p-Xylenes	1330-20-7			NA	NA	NA	NA	NA
Methylene Chloride	75-09-2	5		6.2 U	1 U	1 U	1 U	1 U
N-Butylbenzene	104-51-8			NA	NA	NA	NA	NA
N-Propylbenzene	103-65-1			NA	NA	NA	NA	NA
Naphthalene	91-20-3	20		NA	NA	NA	NA	NA
o-Xylene	95-47-6			NA	NA	NA	NA	NA
sec-Butylbenzene	135-98-8			NA	NA	NA	NA	NA
Styrene	100-42-5	100		6.2 U	1 U	1 U	1 U	1 U
tert-Butylbenzene	98-06-6			NA	NA	NA	NA	NA
Tetrachloroethene	127-18-4	3		6.2 U	1.5	2.3	1 U	1 U
Toluene	108-88-3	40		6.2 U	1 U	1 U	1 U	1 U
Total xylenes	1330-20-7	20		6.2 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	156-60-5	100		0.46 J	0.2 J	0.15 J	1 U	1 U
trans-1,3-Dichloropropene	10061-02-6	0.2		6.2 U	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3		**180**	**19**	**5.1**	**8.1**	1 U
Trichlorofluoromethane	75-69-4	2100		NA	NA	NA	NA	NA
Vinyl chloride	75-01-4	1		6.2 U	1 U	1 U	1 U	1 U
Inorganics (ug/L)								
Antimony	7440-36-0	6	4.1	NA	NA	NA	NA	NA

TABLE C-2

VALIDATED GROUNDWATER ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Identification Number	CAS No.	Screening Criteria[a]	BGSV[c]	6-13D	OLD-36-14D	OLD-36-15A	OLD-36-16A	OLD-36-17B
Sample Number		Florida GCTL[b]		NTC36G13D10-D	NTC36G14D10	NTC36G15A10	NTC36G16A11	NTC36G17B11
Sample Date		(µg/L)	(µg/L)	4/16/2000	4/16/2000	4/18/2000	8/24/2000	8/24/2000
Volatiles (ug/L)								
1,1,1,2-Tetrachloroethane	630-20-6	1.2		NA	NA	NA	NA	NA
1,1,1-Trichloroethane	71-55-6	200		1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2		1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	79-00-5	5		1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	75-34-3	70		1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	75-35-4	7		1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	563-58-6			NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	87-61-6	70		NA	NA	NA	NA	NA
1,2,3-Trichloropropane	96-18-4	0.2		NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	70		NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	95-63-6	10		NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	96-12-8	0.2		NA	NA	NA	NA	NA
1,2-Dibromoethane	106-93-4	0.02		NA	NA	NA	NA	NA
1,2-Dichlorobenzene	95-50-1	600		NA	NA	NA	NA	NA
1,2-Dichloroethane	107-06-2	3		1 U	1 U	0.14 J	1 U	1 U
1,2-Dichloropropane	78-87-5	5		1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	10		NA	NA	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	10		NA	NA	NA	NA	NA
1,3-Dichloropropane	142-28-9			NA	NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	75		NA	NA	NA	NA	NA
1-Chlorohexane	544-10-5			NA	NA	NA	NA	NA
2,2-Dichloropropane	594-20-7			NA	NA	NA	NA	NA
2-Butanone	78-93-3	4200		10 UR	10 UR	10 U	10 UR	10 UR
2-Chlorotoluene	95-49-8			NA	NA	NA	NA	NA
2-Hexanone	591-78-6	280		10 U	10 U	10 U	10 UJ	10 UJ
4-Chlorotoluene	106-43-4			NA	NA	NA	NA	NA
4-Isopropyltoluene	99-87-6			NA	NA	NA	NA	NA
4-Methyl-2-pentanone	108-10-1	560		10 U	10 U	10 U	5 U	5 U
Acetone	67-64-1	700		3 J	10 UR	2.6 J	10 UR	10 UR
Benzene	71-43-2	1		1 U	1 U	1 U	1 U	1 U
Bromobenzene	108-86-1			NA	NA	NA	NA	NA
Bromochloromethane	74-97-5	91		NA	NA	NA	NA	NA
Bromodichloromethane	75-27-4	0.6		1 U	1 U	1 U	1 U	1 U
Bromoform	75-25-2	4.4		1 U	1 U	1 U	1 U	1 U
Bromomethane	74-83-9	9.8		1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	75-15-0	700		1 U	1 U	1 U	0.3 J	0.13 J
Carbon tetrachloride	56-23-5	3		1 U	1 U	1 U	1 U	1 U
Chlorobenzene	108-90-7	100		1 U	1 U	1 U	1 U	1 U
Chlorodibromomethane	124-48-1	0.4		NA	NA	NA	NA	NA
Chloroethane	75-00-3	12		1 U	1 U	1 U	1 U	1 U
Chloroform	67-66-3	5.7		1 U	0.14 J	1 U	0.32 J	0.6 J
Chloromethane	74-87-3	2.7		1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70		1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	10061-01-05	0.2		1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	124-48-1	0.4		1 U	1 U	1 U	1 U	1 U
Dibromomethane	74-95-3			NA	NA	NA	NA	NA
Dichlorodifluoromethane	75-71-8	1400		NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	30		1 U	1 U	1 U	1 U	0.058 J
Hexachlorobutadiene	87-68-3	0.5		NA	NA	NA	NA	NA
Isopropylbenzene	98-82-8	0.8		NA	NA	NA	NA	NA
m+p-Xylenes	1330-20-7			NA	NA	NA	NA	NA
Methylene Chloride	75-09-2	5		1 U	1 U	1 U	1 U	0.19 J
N-Butylbenzene	104-51-8			NA	NA	NA	NA	NA
N-Propylbenzene	103-65-1			NA	NA	NA	NA	NA
Naphthalene	91-20-3	20		NA	NA	NA	NA	NA
o-Xylene	95-47-6			NA	NA	NA	NA	NA
sec-Butylbenzene	135-98-8			NA	NA	NA	NA	NA
Styrene	100-42-5	100		1 U	1 U	1 U	1 U	1 U
tert-Butylbenzene	98-06-6			NA	NA	NA	NA	NA
Tetrachloroethene	127-18-4	3		1 U	1 U	1 U	1 U	1 U
Toluene	108-88-3	40		1 U	1 U	1 U	1 U	0.15 J
Total xylenes	1330-20-7	20		1 U	1 U	1 U	1 U	0.37 J
trans-1,2-Dichloroethene	156-60-5	100		1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	10061-02-6	0.2		1 U	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3		1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	75-69-4	2100		NA	NA	NA	NA	NA
Vinyl chloride	75-01-4	1		1 U	1 U	1 U	1 U	1 U
Inorganics (ug/L)								
Antimony	7440-36-0	6	4.1	NA	NA	6 U	NA	NA

TABLE C-2

VALIDATED GROUNDWATER ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Identification Number	CAS No.	Screening Criteria[a]	BGSV[c]	OLD-36-18C	OLD-36-19A	OLD-36-20B	OLD-36-21C	OLD-36-22B
Sample Number		Florida GCTL[b]		NTC36G18C11	NTC36G19A11	NTC36G20B11	NTC36G21C11	NTC36G22B11
Sample Date		(µg/L)	(µg/L)	8/24/2000	8/24/2000	8/24/2000	8/24/2000	8/24/2000
Volatiles (ug/L)								
1,1,1,2-Tetrachloroethane	630-20-6	1.2		NA	NA	NA	NA	NA
1,1,1-Trichloroethane	71-55-6	200		1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2		1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	79-00-5	5		1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	75-34-3	70		1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	75-35-4	7		1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	563-58-6			NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	87-61-6	70		NA	NA	NA	NA	NA
1,2,3-Trichloropropane	96-18-4	0.2		NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	70		NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	95-63-6	10		NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	96-12-8	0.2		NA	NA	NA	NA	NA
1,2-Dibromoethane	106-93-4	0.02		NA	NA	NA	NA	NA
1,2-Dichlorobenzene	95-50-1	600		NA	NA	NA	NA	NA
1,2-Dichloroethane	107-06-2	3		1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	78-87-5	5		1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	10		NA	NA	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	10		NA	NA	NA	NA	NA
1,3-Dichloropropane	142-28-9			NA	NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	75		NA	NA	NA	NA	NA
1-Chlorohexane	544-10-5			NA	NA	NA	NA	NA
2,2-Dichloropropane	594-20-7			NA	NA	NA	NA	NA
2-Butanone	78-93-3	4200		10 UR	10 UR	10 UR	10 UR	10 UR
2-Chlorotoluene	95-49-8			NA	NA	NA	NA	NA
2-Hexanone	591-78-6	280		10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
4-Chlorotoluene	106-43-4			NA	NA	NA	NA	NA
4-Isopropyltoluene	99-87-6			NA	NA	NA	NA	NA
4-Methyl-2-pentanone	108-10-1	560		5 U	5 U	5 U	5 U	5 U
Acetone	67-64-1	700		12 J	10 UR	10 UR	10 UR	10 UR
Benzene	71-43-2	1		1 U	1 U	1 U	1 U	1 U
Bromobenzene	108-86-1			NA	NA	NA	NA	NA
Bromochloromethane	74-97-5	91		NA	NA	NA	NA	NA
Bromodichloromethane	75-27-4	0.6		1 U	1 U	1 U	1 U	1 U
Bromoform	75-25-2	4.4		1 U	1 U	1 U	1 U	1 U
Bromomethane	74-83-9	9.8		1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	75-15-0	700		1 U	1 U	0.11 J	0.67 J	1 U
Carbon tetrachloride	56-23-5	3		1 U	1 U	1 U	1 U	1 U
Chlorobenzene	108-90-7	100		1 U	1 U	1 U	1 U	1 U
Chlorodibromomethane	124-48-1	0.4		NA	NA	NA	NA	NA
Chloroethane	75-00-3	12		1 U	1 U	1 U	1 U	1 U
Chloroform	67-66-3	5.7		0.52 J	1 U	0.087 J	1.2	1 U
Chloromethane	74-87-3	2.7		1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70		1 U	1 U	1 U	1 U	1.9
cis-1,3-Dichloropropene	10061-01-05	0.2		1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	124-48-1	0.4		1 U	1 U	1 U	1 U	1 U
Dibromomethane	74-95-3			NA	NA	NA	NA	NA
Dichlorodifluoromethane	75-71-8	1400		NA	NA	NA	NA	NA
Ethylbenzene	100-41-4	30		0.19 J	1 U	1 U	1 U	1 U
Hexachlorobutadiene	87-68-3	0.5		NA	NA	NA	NA	NA
Isopropylbenzene	98-82-8	0.8		NA	NA	NA	NA	NA
m+p-Xylenes	1330-20-7			NA	NA	NA	NA	NA
Methylene Chloride	75-09-2	5		1 U	1 U	1 U	0.16 J	1 U
N-Butylbenzene	104-51-8			NA	NA	NA	NA	NA
N-Propylbenzene	103-65-1			NA	NA	NA	NA	NA
Naphthalene	91-20-3	20		NA	NA	NA	NA	NA
o-Xylene	95-47-6			NA	NA	NA	NA	NA
sec-Butylbenzene	135-98-8			NA	NA	NA	NA	NA
Styrene	100-42-5	100		1 U	1 U	1 U	1 U	1 U
tert-Butylbenzene	98-06-6			NA	NA	NA	NA	NA
Tetrachloroethene	127-18-4	3		1 U	1 U	1 U	1 U	1 U
Toluene	108-88-3	40		0.28 J	1 U	1 U	0.11 J	1 U
Total xylenes	1330-20-7	20		1.1	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	156-60-5	100		1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	10061-02-6	0.2		1 U	1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3		1 U	1 U	0.061 J	0.84 J	0.15 J
Trichlorofluoromethane	75-69-4	2100		NA	NA	NA	NA	NA
Vinyl chloride	75-01-4	1		1 U	1 U	1 U	1 U	1 U
Inorganics (ug/L)								
Antimony	7440-36-0	6	4.1	NA	NA	NA	NA	NA

TABLE C-2

VALIDATED GROUNDWATER ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Identification Number	CAS No.	Screening Criteria[a]	BGSV[c]	OLD-36-23C	OLD-36-24B	OLD-36-25C	
Sample Number		Florida GCTL[b]		NTC36G23C11	NTC36G24B11	NTC36G25C11	NTC36G25C11-D
Sample Date		(µg/L)	(µg/L)	8/24/2000	8/24/2000	8/24/2000	8/24/2000
Volatiles (ug/L)							
1,1,1,2-Tetrachloroethane	630-20-6	1.2		NA	NA	NA	NA
1,1,1-Trichloroethane	71-55-6	200		1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2		1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	79-00-5	5		1 U	1 U	1 U	1 U
1,1-Dichloroethane	75-34-3	70		1 U	1 U	1 U	1 U
1,1-Dichloroethene	75-35-4	7		1 U	1 U	1 U	1 U
1,1-Dichloropropene	563-58-6			NA	NA	NA	NA
1,2,3-Trichlorobenzene	87-61-6	70		NA	NA	NA	NA
1,2,3-Trichloropropane	96-18-4	0.2		NA	NA	NA	NA
1,2,4-Trichlorobenzene	120-82-1	70		NA	NA	NA	NA
1,2,4-Trimethylbenzene	95-63-6	10		NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	96-12-8	0.2		NA	NA	NA	NA
1,2-Dibromoethane	106-93-4	0.02		NA	NA	NA	NA
1,2-Dichlorobenzene	95-50-1	600		NA	NA	NA	NA
1,2-Dichloroethane	107-06-2	3		1 U	1 U	1 U	1 U
1,2-Dichloropropane	78-87-5	5		1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	10		NA	NA	NA	NA
1,3-Dichlorobenzene	541-73-1	10		NA	NA	NA	NA
1,3-Dichloropropane	142-28-9			NA	NA	NA	NA
1,4-Dichlorobenzene	106-46-7	75		NA	NA	NA	NA
1-Chlorohexane	544-10-5			NA	NA	NA	NA
2,2-Dichloropropane	594-20-7			NA	NA	NA	NA
2-Butanone	78-93-3	4200		10 UR	10 UR	10 UR	10 UR
2-Chlorotoluene	95-49-8			NA	NA	NA	NA
2-Hexanone	591-78-6	280		10 UJ	10 UJ	10 UJ	10 UJ
4-Chlorotoluene	106-43-4			NA	NA	NA	NA
4-Isopropyltoluene	99-87-6			NA	NA	NA	NA
4-Methyl-2-pentanone	108-10-1	560		5 U	5 U	5 U	5 U
Acetone	67-64-1	700		14 J	10 UR	10 UR	10 UR
Benzene	71-43-2	1		0.29 J	1 U	1 U	1 U
Bromobenzene	108-86-1			NA	NA	NA	NA
Bromochloromethane	74-97-5	91		NA	NA	NA	NA
Bromodichloromethane	75-27-4	0.6		1 U	1 U	1 U	1 U
Bromoform	75-25-2	4.4		1 U	1 U	1 U	1 U
Bromomethane	74-83-9	9.8		1 U	1 U	1 U	1 U
Carbon Disulfide	75-15-0	700		1 U	0.13 J	1.5	1.7
Carbon tetrachloride	56-23-5	3		1 U	1 U	1 U	1 U
Chlorobenzene	108-90-7	100		1 U	1 U	1 U	1 U
Chlorodibromomethane	124-48-1	0.4		NA	NA	NA	NA
Chloroethane	75-00-3	12		1 U	1 U	1 U	1 U
Chloroform	67-66-3	5.7		0.67 J	0.34 J	1.6	2
Chloromethane	74-87-3	2.7		1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70		0.74 J	1 U	1 U	1 U
cis-1,3-Dichloropropene	10061-01-05	0.2		1 U	1 U	1 U	1 U
Dibromochloromethane	124-48-1	0.4		1 U	1 U	1 U	1 U
Dibromomethane	74-95-3			NA	NA	NA	NA
Dichlorodifluoromethane	75-71-8	1400		NA	NA	NA	NA
Ethylbenzene	100-41-4	30		0.086 J	1 U	1 U	1 U
Hexachlorobutadiene	87-68-3	0.5		NA	NA	NA	NA
Isopropylbenzene	98-82-8	0.8		NA	NA	NA	NA
m+p-Xylenes	1330-20-7			NA	NA	NA	NA
Methylene Chloride	75-09-2	5		0.39 J	1 U	1 U	1 U
N-Butylbenzene	104-51-8			NA	NA	NA	NA
N-Propylbenzene	103-65-1			NA	NA	NA	NA
Naphthalene	91-20-3	20		NA	NA	NA	NA
o-Xylene	95-47-6			NA	NA	NA	NA
sec-Butylbenzene	135-98-8			NA	NA	NA	NA
Styrene	100-42-5	100		1 U	1 U	1 U	1 U
tert-Butylbenzene	98-06-6			NA	NA	NA	NA
Tetrachloroethene	127-18-4	3		**13**	1 U	1 U	1 U
Toluene	108-88-3	40		0.28 J	1 U	1 U	1 U
Total xylenes	1330-20-7	20		1.5	1 U	1 U	1 U
trans-1,2-Dichloroethene	156-60-5	100		1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	10061-02-6	0.2		1 U	1 U	1 U	1 U
Trichloroethene	79-01-6	3		1.8	1 U	**7.7**	**6.9**
Trichlorofluoromethane	75-69-4	2100		NA	NA	NA	NA
Vinyl chloride	75-01-4	1		1 U	1 U	1 U	1 U
Inorganics (ug/L)							
Antimony	7440-36-0	6	4.1	NA	NA	NA	NA

TABLE C-2

VALIDATED GROUNDWATER ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Identification Number	CAS No.	Screening Criteria[a] Florida GCTL[b] (µg/L)	BGSV[c] (µg/L)	OLD-36-33A	OLD-36-34B	OLD-36-35C
Sample Number				017-OLD-36-33A-Q1-01	017-OLD-36-34B-Q1-01	017-OLD-36-35C-Q1-01
Sample Date				3/16/2001	3/16/2001	3/16/2001
Volatiles (ug/L)						
1,1,1,2-Tetrachloroethane	630-20-6	1.2		0.41 U	0.41 U	0.41 U
1,1,1-Trichloroethane	71-55-6	200		0.56 U	0.56 U	0.56 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2		0.42 U	0.42 U	0.42 U
1,1,2-Trichloroethane	79-00-5	5		0.49 U	0.49 U	0.49 U
1,1-Dichloroethane	75-34-3	70		0.55 U	0.55 U	0.55 U
1,1-Dichloroethene	75-35-4	7		0.61 U	0.61 U	0.61 U
1,1-Dichloropropene	563-58-6			NA	NA	NA
1,2,3-Trichlorobenzene	87-61-6	70		0.4 U	0.4 U	0.4 U
1,2,3-Trichloropropane	96-18-4	0.2		0.86 U	0.86 U	0.86 U
1,2,4-Trichlorobenzene	120-82-1	70		0.45 U	0.45 U	0.45 U
1,2,4-Trimethylbenzene	95-63-6	10		0.54 U	0.54 U	0.54 U
1,2-Dibromo-3-chloropropane	96-12-8	0.2		0.37 U	0.37 U	0.37 U
1,2-Dibromoethane	106-93-4	0.02		0.52 U	0.52 U	0.52 U
1,2-Dichlorobenzene	95-50-1	600		0.54 U	0.54 U	0.54 U
1,2-Dichloroethane	107-06-2	3		0.46 U	0.46 U	0.46 U
1,2-Dichloropropane	78-87-5	5		0.54 U	0.54 U	0.54 U
1,3,5-Trimethylbenzene	108-67-8	10		0.6 U	0.6 U	0.6 U
1,3-Dichlorobenzene	541-73-1	10		0.46 U	0.46 U	0.46 U
1,3-Dichloropropane	142-28-9			0.42 U	0.42 U	0.42 U
1,4-Dichlorobenzene	106-46-7	75		0.58 U	0.58 U	0.58 U
1-Chlorohexane	544-10-5			NA	NA	NA
2,2-Dichloropropane	594-20-7			0.53 U	0.53 U	0.53 U
2-Butanone	78-93-3	4200		NA	NA	NA
2-Chlorotoluene	95-49-8			0.55 U	0.55 U	0.55 U
2-Hexanone	591-78-6	280		NA	NA	NA
4-Chlorotoluene	106-43-4			0.52 U	0.52 U	0.52 U
4-Isopropyltoluene	99-87-6			0.51 U	0.51 U	0.51 U
4-Methyl-2-pentanone	108-10-1	560		NA	NA	NA
Acetone	67-64-1	700		NA	NA	NA
Benzene	71-43-2	1		0.51 U	0.51 U	0.51 U
Bromobenzene	108-86-1			0.53 U	0.53 U	0.53 U
Bromochloromethane	74-97-5	91		0.59 U	0.59 U	0.59 U
Bromodichloromethane	75-27-4	0.6		0.49 U	0.49 U	0.49 U
Bromoform	75-25-2	4.4		0.3 U	0.3 U	0.3 U
Bromomethane	74-83-9	9.8		0.46 U	0.46 U	0.46 U
Carbon Disulfide	75-15-0	700		NA	NA	NA
Carbon tetrachloride	56-23-5	3		0.26 U	0.26 U	0.26 U
Chlorobenzene	108-90-7	100		0.54 U	0.54 U	0.54 U
Chlorodibromomethane	124-48-1	0.4		0.37 U	0.37 U	0.37 U
Chloroethane	75-00-3	12		0.34 U	0.34 U	0.34 U
Chloroform	67-66-3	5.7		0.53 U	0.53 U	0.53 U
Chloromethane	74-87-3	2.7		0.45 U	0.45 U	0.45 U
cis-1,2-Dichloroethene	156-59-2	70		0.55 U	0.55 U	0.55 U
cis-1,3-Dichloropropene	10061-01-05	0.2		0.55 U	0.55 U	0.55 U
Dibromochloromethane	124-48-1	0.4		NA	NA	NA
Dibromomethane	74-95-3			0.51 U	0.51 U	0.51 U
Dichlorodifluoromethane	75-71-8	1400		0.51 U	0.51 U	0.51 U
Ethylbenzene	100-41-4	30		0.52 U	0.52 U	0.52 U
Hexachlorobutadiene	87-68-3	0.5		0.6 U	0.6 U	0.6 U
Isopropylbenzene	98-82-8	0.8		0.49 U	0.49 U	0.49 U
m+p-Xylenes	1330-20-7			NA	NA	NA
Methylene Chloride	75-09-2	5		0.65 J	0.52 J	0.53 J
N-Butylbenzene	104-51-8			0.47 U	0.47 U	0.47 U
N-Propylbenzene	103-65-1			0.62 U	0.62 U	0.62 U
Naphthalene	91-20-3	20		0.57 U	0.57 U	0.57 U
o-Xylene	95-47-6			NA	NA	NA
sec-Butylbenzene	135-98-8			0.53 U	0.53 U	0.53 U
Styrene	100-42-5	100		0.44 U	0.44 U	0.44 U
tert-Butylbenzene	98-06-6			0.48 U	0.48 U	0.48 U
Tetrachloroethene	127-18-4	3		0.49 U	0.49 U	0.49 U
Toluene	108-88-3	40		0.52 U	0.52 U	0.52 U
Total xylenes	1330-20-7	20		0.95 U	0.95 U	0.95 U
trans-1,2-Dichloroethene	156-60-5	100		0.58 U	0.58 U	0.58 U
trans-1,3-Dichloropropene	10061-02-6	0.2		0.43 U	0.43 U	0.43 U
Trichloroethene	79-01-6	3		0.53 U	0.53 U	0.53 U
Trichlorofluoromethane	75-69-4	2100		0.55 U	0.55 U	0.55 U
Vinyl chloride	75-01-4	1		0.56 U	0.56 U	0.56 U
Inorganics (ug/L)						
Antimony	7440-36-0	6	4.1	NA	NA	NA

TABLE C-2

VALIDATED GROUNDWATER ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Well Identification Number	CAS No.	Screening Criteria[a] Florida GCTL[b] (µg/L)	BGSV[c] (µg/L)	OLD-36-36C	OLD-36-37C	OLD-36-01AR	OLD-36-10BR
Sample Number				017-OLD-36-36C-Q1-01	017-OLD-36-37C-Q1-01	173601ARQ202	173610BRQ202
Sample Date				3/16/2001	3/16/2001	4/26/2002	4/26/2002
Volatiles (ug/L)							
1,1,1,2-Tetrachloroethane	630-20-6	1.2		0.41 U	0.41 U	1 U	1 U
1,1,1-Trichloroethane	71-55-6	200		0.56 U	0.56 U	1 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2		0.42 U	0.42 U	1 U	1 U
1,1,2-Trichloroethane	79-00-5	5		0.49 U	0.49 U	1 U	1 U
1,1-Dichloroethane	75-34-3	70		0.55 U	0.55 U	1 U	1 U
1,1-Dichloroethene	75-35-4	7		0.61 U	0.61 U	1 U	1 U
1,1-Dichloropropene	563-58-6			NA	NA	1 U	1 U
1,2,3-Trichlorobenzene	87-61-6	70		0.4 U	0.4 U	1 U	1 U
1,2,3-Trichloropropane	96-18-4	0.2		0.86 U	0.86 U	1 U	1 U
1,2,4-Trichlorobenzene	120-82-1	70		0.45 U	0.45 U	1 U	1 U
1,2,4-Trimethylbenzene	95-63-6	10		0.54 U	0.54 U	1 U	1 U
1,2-Dibromo-3-chloropropane	96-12-8	0.2		0.37 U	0.37 U	1 U	1 U
1,2-Dibromoethane	106-93-4	0.02		0.52 U	0.52 U	1 U	1 U
1,2-Dichlorobenzene	95-50-1	600		0.54 U	0.54 U	1 U	1 U
1,2-Dichloroethane	107-06-2	3		0.46 U	0.46 U	1 U	1 U
1,2-Dichloropropane	78-87-5	5		0.54 U	0.54 U	1 U	1 U
1,3,5-Trimethylbenzene	108-67-8	10		0.6 U	0.65 J	1 U	1 U
1,3-Dichlorobenzene	541-73-1	10		0.46 U	0.46 U	1 U	1 U
1,3-Dichloropropane	142-28-9			0.42 U	0.42 U	1 U	1 U
1,4-Dichlorobenzene	106-46-7	75		0.58 U	0.58 U	1 U	1 U
1-Chlorohexane	544-10-5			NA	NA	1 U	1 U
2,2-Dichloropropane	594-20-7			0.53 U	0.53 U	1 U	1 U
2-Butanone	78-93-3	4200		NA	NA	NA	NA
2-Chlorotoluene	95-49-8			0.55 U	0.55 U	1 U	1 U
2-Hexanone	591-78-6	280		NA	NA	NA	NA
4-Chlorotoluene	106-43-4			0.52 U	0.52 U	1 U	1 U
4-Isopropyltoluene	99-87-6			0.51 U	0.51 U	1 U	1 U
4-Methyl-2-pentanone	108-10-1	560		NA	NA	NA	NA
Acetone	67-64-1	700		NA	NA	NA	NA
Benzene	71-43-2	1		0.51 U	**24**	1 U	1 U
Bromobenzene	108-86-1			0.53 U	0.53 U	1 U	1 U
Bromochloromethane	74-97-5	91		0.59 U	0.59 U	1 U	1 U
Bromodichloromethane	75-27-4	0.6		0.49 U	0.49 U	1 U	1 U
Bromoform	75-25-2	4.4		0.3 U	0.3 U	1 U	1 U
Bromomethane	74-83-9	9.8		0.46 U	0.46 U	1 U	1 U
Carbon Disulfide	75-15-0	700		NA	NA	NA	NA
Carbon tetrachloride	56-23-5	3		0.26 U	0.26 U	1 U	1 U
Chlorobenzene	108-90-7	100		0.54 U	0.54 U	1 U	1 U
Chlorodibromomethane	124-48-1	0.4		0.37 U	0.37 U	1 U	1 U
Chloroethane	75-00-3	12		0.34 U	0.34 U	1 U	1 U
Chloroform	67-66-3	5.7		0.53 U	0.53 U	1 U	1 U
Chloromethane	74-87-3	2.7		0.45 U	0.45 U	1 U	1 U
cis-1,2-Dichloroethene	156-59-2	70		0.55 U	0.55 U	2.2	1.2
cis-1,3-Dichloropropene	10061-01-05	0.2		0.55 U	0.55 U	1 U	1 U
Dibromochloromethane	124-48-1	0.4		NA	NA	NA	NA
Dibromomethane	74-95-3			0.51 U	0.51 U	1 U	1 U
Dichlorodifluoromethane	75-71-8	1400		0.51 U	0.51 U	1 U	1 U
Ethylbenzene	100-41-4	30		0.52 U	0.52 U	1 U	1 U
Hexachlorobutadiene	87-68-3	0.5		0.6 U	0.6 U	1 U	1 U
Isopropylbenzene	98-82-8	0.8		0.49 U	0.49 U	1 U	1 U
m+p-Xylenes	1330-20-7			NA	NA	2 U	2 U
Methylene Chloride	75-09-2	5		1.3 U	1.3 U	1 U	1 U
N-Butylbenzene	104-51-8			0.47 U	0.47 U	1 U	1 U
N-Propylbenzene	103-65-1			0.62 U	0.62 U	1 U	1 U
Naphthalene	91-20-3	20		0.57 U	0.57 U	1 U	1 U
o-Xylene	95-47-6			NA	NA	1 U	1 U
sec-Butylbenzene	135-98-8			0.53 U	0.53 U	1 U	1 U
Styrene	100-42-5	100		0.44 U	0.44 U	1 U	1 U
tert-Butylbenzene	98-06-6			0.48 U	0.48 U	1 U	1 U
Tetrachloroethene	127-18-4	3		0.49 U	0.49 U	1 U	1 U
Toluene	108-88-3	40		0.52 U	0.52 U	1 U	1 U
Total xylenes	1330-20-7	20		0.95 U	0.95 U	NA	NA
trans-1,2-Dichloroethene	156-60-5	100		0.58 U	0.58 U	1 U	1 U
trans-1,3-Dichloropropene	10061-02-6	0.2		0.43 U	0.43 U	1 U	1 U
Trichloroethene	79-01-6	3		0.53 U	0.53 U	1.2	0.44 J
Trichlorofluoromethane	75-69-4	2100		0.55 U	0.55 U	1 U	1 U
Vinyl chloride	75-01-4	1		0.56 U	0.56 U	1 U	1 U
Inorganics (ug/L)							
Antimony	7440-36-0	6	4.1	NA	NA	NA	NA

TABLE C-2

VALIDATED GROUNDWATER ANALYTICAL DATA
STUDY AREA 36

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Notes:

Only chemicals detected in at least one sample are shown.

Values in shaded cells are equal to or exceed the screening criteria.

[(a)] For an organic analyte, the screening criterion is the GCTL.

For an inorganic analyte with an established GCTL and BGSV, the screening criterion is the greater of the GCTL or the BGSV.

[(b)] Groundwater Cleanup Target Level [Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999].

[(c)] Background Screening Valuefor inorganics only (ABB-ES, 1995).

NA Not analyzed.

"U" qualifier indicates that the analyte/compound was analyzed for but was not detected above the reported sample quantitation limit

"J" qualifier indicates that the analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample.

"R" qualifier indicates that the sample results were rejected during data validation because of serious deficiencies in meeting quality control criteria.

APPENDIX D

IRA DATA

IRA GROUNDWATER ELEVATION DATA
STUDY AREA 36
NTC ORLANDO, FLORIDA

Replacement Wells	Easting	Northing	TOC	April 15, 2002		August 16, 2002		August 24, 2002	
				DTW	Elevation	DTW	Elevation	DTW	Elevation
OLD-36-01AR	549,500.75	1,537,944.63	117.19	12.98	104.21	7.8	109.39	8.05	109.14
OLD-36-02AR	549,528.51	1,537,979.36	116.9	12.66	104.24	7.48	109.42	7.72	109.18
OLD-36-07AR	549,527.90	1,537,896.16	116.93	--[a]	--	9.01[a]	107.92	7.43[a]	109.5
OLD-36-19AR	549,443.90	1,537,909.92	117.85	13.64	104.21	8.58	109.27	8.99	108.86
OLD-36-33AR	549,646.95	1,537,824.33	118.2	13.52	104.68	7.97	110.23	8.08	110.12
OLD-36-08BR	549,525.33	1,537,888.80	114.9	10.64	104.26	5.25	109.65	5.5	109.4
OLD-36-10BR	549,506.06	1,537,944.37	118.34	14.14	104.2	8.95	109.39	9.2	109.14
OLD-36-20BR	549,444.00	1,537,914.20	117.41	13.19	104.22	8.15	109.26	8.55	108.86
OLD-36-22BR	549,531.55	1,537,983.82	117.72	13.5	104.22	8.33	109.39	8.55	109.17
OLD-36-24BR	549,648.73	1,537,828.82	117.18	12.54	104.64	7.32	109.86	7.34	109.84
OLD-36-09CR	549,523.79	1,537,884.94	114.5	13.93	100.57	8.51	105.99	8.41	106.09
OLD-36-11CR	549,503.20	1,537,949.16	119.08	16.01	103.07	12.95	106.13	12.87	106.21
OLD-36-18CR	549,485.73	1,537,805.46	115.38	15.25	100.13	9.35	106.03	9.25	106.13
OLD-36-23CR	549,534.13	1,537,987.62	114.69	14.91	99.78	8.64	106.05	8.54	106.15
OLD-36-25CR	549,585.01	1,537,845.36	117.01	16.6	100.41	10.97	106.04	10.87	106.14
OLD-36-35CR	549,674.58	1,537,878.57	120.47	15.66	104.81	10.2	110.27	14.52	105.95
OLD-36-36CR	549,651.00	1,537,834.12	120.08	14.8	105.28	9.36	110.72	13.95	106.13

All units are feet above mean sea level.

TOC - surveyed top of casing elevation in feet msl (casings had not been flush-completed at time of measurements).

DTW - depth to water below top of casing.

April and August 16, 2002 data provided by CH2MHILL Constructors, Inc.; August 24, 2002 data collected by Tetra Tech NUS, Inc.

[a] Vegetable oil layer reported to be >12 inches on April 15, 2002; not determined on August 16, 2002; 1.3 ft measured on August 24, 2002, and DTW shown represents correction of 1.25 ft (spec. gravity of 0.959 for Castor oil [8001-79-4] used for vegetable oil)

Table 2-5
Summary of Detected Constituents
SA-36. NTC Orlando December 2000, March 2001, July 2001 and October 2001 Groundwater Sampling Results

IRA ANALYTICAL DATA
(CCI, 2002)

		Station ID:	OLD-36-06A	OLD-36-06A	OLD-36-06A	OLD-36-06A	OLD-36-07A	OLD-36-07A	OLD-36-07A	OLD-36-07A	OLD-36-08B	OLD-36-08B	OLD-36-08B	OLD-36-08B	OLD-36-09C	OLD-36-09C	OLD-36-09C
		Client Sample ID:	17-OLD-36-06A-Q4-01	017-OLD-36-06A-Q3-01	017-OLD-36-06A-Q1-01	017-OLD-36-06A-Q4-00	17-OLD-36-07A-Q4-01	017-OLD-36-07A-Q3-01	017-OLD-36-07A-Q1-01	017-OLD-36-07A-Q4-00	17-OLD-36-08B-Q4-01	017-OLD-36-08B-Q3-01	017-OLD-36-08B-Q1-01	017-OLD-36-08B-Q4-00	17-OLD-36-09C-Q4-01	017-OLD-36-09C-Q3-01	017-OLD-36-09C-Q1-01
		Lab Sample ID	C110655*3	AC17919	AC09821	AC04412	C110655*2	AC17890	AC09822	AC04279	C110655*1	AC17920	AC09841	AC04413	C110611*1	AC17891	AC09845
		Lab Sample ID	P0110472-03	C108048*1	C103383*4		P0110472-02	C108004*5	C103383*5		P0110472-01	C108048*2	C103409*4		P0110454-08	C108004*6	C103409*3
		Lab Sample ID			P0103235-04				P0103235-05				P0103256-04				P0103256-03
		Date Collected:	10/25/2001	08/01/2001	03/14/2001	12/04/2000	10/25/2001	07/31/2001	03/14/2001	12/01/2000	10/25/2001	08/01/2001	03/15/2001	12/04/2000	10/24/2001	07/31/2001	03/15/2001
Parameter	**Units**																
Miscellaneous Parameters		**Screening Criteria [1]**															
Acetic Acid	mg/l	NA										24 =				4.3 =	
Butyric Acid	mg/l	NA										1.9 =					
Propionic Acid	mg/l	NA	1.6 =				24 =	4.7 =			47 =	74 =			17=	8.7 =	
Ethane	ng/l	NA	330 =	430 =	17 =		3100 =	110 =	24 =		820 =	900 =	18 =		75 =	160 =	210 =
Ethene	ng/l	NA	77 =	360 =	13 =		2500 =	77 =	21 =		3200 =	5600 =	110 =		500 =	430 =	670 =
Methane	ug/l	NA	2000 =	69 =	1.7 =		10000 =	1700 =	4.7 =		9300 =	8900 =	80 =		4000 =	1700 =	51 =
Methane	ug/ml	NA												0.09 =			
Alkalinity	mg/l	NA	71 =	10 =	6 =	1.5 =	74 =	13 =	16 =	16 =	67 =	83 =	22 =	24 =	210 =	180 =	330 =
Bromide	mg/l	NA															
Chloride	mg/l	250	73 =	1.9 =	8.4 =	4.2 =	120 =	3.2 =	7.7 =	6.2 =	23 =	7 =	6.1 =	7 =	17 =	8.3 =	9.5 =
Dissolved Hydrogen	nM	NA	2 =				18 =				13 =				150 =		
Iron	ug/l	1,227			440 =				450 =				400 =				180 =
Iron, Dissolved	ug/l	1,227	120 =	32 J			720 =	60 J			400 =	450 =			27 J	11 J	
Sodium	mg/l	160				4.1 =				5.4 =				7.8 =			
Sulfide	mg/l	NA									2.9 =	2.9 =			4.2 =	3.4 =	2.7 =
Nitrate Nitrogen	mg/l	10	0.5 =	2.98 =	0.09 =		0.21 =	0.5 =	0.09 =	0.2 =	0.18 =				0.23 =		
Nitrate-Nitrite Nitrogen	mg/l	10	0.5 =			0.33 =	0.21 =				0.18 =				0.23 =		
Petroleum Range Organics (PRO)	mg/l	NA			0.42 JB		6.5 =		0.4 JB	0.44 JB	4.4 =	8.1 =	0.66 JB				2 JB
Total Dissolved Solids	mg/l	500	180 =	190 J	150 =	110 =	510 =	120 J	170 =	110 =	210 =	110 J	270 =	100 =	300 =	290 J	120 =
Total Organic Carbon	mg/l	NA	21 =	14 =	12 =	10.7 =	78 =	10 =	11 =	12.5 =	83 =	94 =	3 =	3.55 =	35 =	29 =	14 =
Volatile Organic Constituents																	
1,1-Dichloroethene	ug/l	7													0.29 J		
1,2,4-Trimethylbenzene	ug/l	10															
1,2-Dichlorobenzene	ug/l	60															
1,3,5-Trimethylbenzene	ug/l	10															
Benzene	ug/l	1					0.78 =										
Chloroform	ug/l	5.7															
Chloromethane	ug/l	2.7										0.6 J					
cis-1,2-Dichloroethene	ug/l	70	0.18 J				37 =	0.78 J			26 =	17 =			57 =	27 =	20 J
Methylene chloride	ug/l	5			0.64 J				5.2 J								
p-Isopropyltoluene	ug/l	NA									0.35 =	0.88 J		0.8 J			
Tetrachloroethylene	ug/l	3															
trans-1,2-Dichloroethene	ug/l	100					0.52 =				0.32 =				0.96 =		
Toluene	ug/l	1000		1.2 J				1.1 J				1 J				1.2 J	
Total Xylenes	ug/l	10,000															
Trichloroethylene	ug/l	3	0.66 =		9.5 =	14 =	12 =	11 =	35 =	59 =	25 =	44 =	35 =	97 =	150 =	140 =	180 =
Vinyl chloride	ug/l	1													0.18 J		

NOTES
[1] for an organic analyte. The screening criterion is the GCTL for an inorganic analyte with an established
GCTL and background screening value. The screening criterion is the greater of the GCTL or background screening value.
Values in shaded cells meet or exceed the screening criterion
"=" qualifier indicates parameter detected at indicated concentration.
"J" qualifier indicates an estimated value.
Empty cells indicate non-detects
NA indicates no screening criterion available
B=qualifier indicated parameter detected in blank

Table 2-5
Summary of Detected Constituents
SA-36. NTC Orlando December 2000, March 2001, July 2001 and October 2001 Groundwater Sampling Results

IRA ANALYTICAL DATA
(CCI, 2002)

Parameter	OLD-36-09C 017-OLD-36-09C-Q4-00 AC04474 12/05/2000	OLD-36-10B 17-OLD-36-10B-Q4-01 C110557*1 P0110454-01 10/22/2001	OLD-36-10B 017-OLD-36-10B-Q3-01 AC17922 C108048*4 08/01/2001	OLD-36-10B 017-OLD-36-10B-Q1-01 AC09839 C103409*1 P0103256-01 03/15/2001	OLD-36-10B 017-OLD-36-10B-Q4-00 AC04417 12/04/2000	OLD-36-11C 17-OLD-36-11C-Q4-01 C110557*2 P0110454-02 10/22/2001	OLD-36-11C 017-OLD-36-11C-Q3-01 AC17923 C108048*5 08/01/2001	OLD-36-11C 017-OLD-36-11C-Q1-01 AC09840 C103409*2 P0103256-02 03/15/2001	OLD-36-11C 017-OLD-36-11C-Q4-00 AC04568 12/06/2000	OLD-36-12C 017-OLD-36-12C-Q4-00 AC04476 12/05/2000	OLD-36-19A 17-OLD-36-19A-Q4-01 C110681*1 P0110472-04 10/26/2001	OLD-36-19A 017-OLD-36-19A-Q3-01 AC17978 08/02/2001	OLD-36-23C 017-OLD-36-23C-Q4-00 AC04569 12/06/2000	OLD-36-24B 17-OLD-36-24B-Q4-01 C110681*2 P0110472-05 10/26/2001	OLD-36-24B 017-OLD-36-24B-Q3-01 AC17979 C108110*2 08/02/2001	OLD-36-25C 17-OLD-36-25C-Q4-01 C110728*1 P0110486-01 10/29/2001
Miscellaneous Parameters																
Acetic Acid																
Butyric Acid																
Propionic Acid											2.6 =					
Ethane		120 =	62 =	35 =		48 =	28 =	18 =				150 =		7.2 =	360 =	
Ethene		940 =	76 =	63 =		110 =	45 =	57 =				5600 =		37 =	410 =	100 =
Methane		620 =	490 =	9.9 =		44 =	18 =	4.8 =			0.093 =	7.8 =		0.32 =	49 =	27 =
Methane	0.036 =												0.037 =			
Alkalinity	280 =	29 =	21 =	32 =	25 =	7.8 =	12 =	16 =	14 =	17 =	29 =	14 =	25 =		8.6 =	
Bromide																
Chloride	8.9 =	30 =	8.1 =	3.3 =	6.4 =	8.6 =	4.3 =	5.7 =	6.3 =	5.7 =	8.9 =	11.4 =	3.7 =	7.1 =	3.6 =	5.7 =
Dissolved Hydrogen		6.8 =				1.3 =					0.6 =			0.75 =		0.86 =
Iron				210 =				220 =								
Iron, Dissolved		54 J	81 J			77 J	95 J							760 =	100 =	670 =
Sodium	11 =				6.6 =				4.7 =	8.8 =			8.8 =			
Sulfide		1.5 =	0.97 J												1.2 =	
Nitrate Nitrogen						0.1 =					15 =	78.7 =		0.87 =		0.08 =
Nitrate-Nitrite Nitrogen						0.1 =					15 =			0.87 =		0.08 =
Petroleum Range Organics (PRO)	0.35 JB			1.3 JB				0.75 JB	0.34 J	0.4 JB		0.27 J	0.28 J		0.24 J	
Total Dissolved Solids	390 =	110 =	98 J	210 =	130 =	50 =	57 J	51 =	85 =	300 =	230 =	700 J	600 =	160 =	37 J	64 =
Total Organic Carbon	19.8 =	11 =	13 =	17 =	15.7 =	9.7 =	10 =	11 =	8.77 =	22.7 =	4.1 =	3 =	15 =	4 =	11 =	3.5 =
Volatile Organic Constituents																
1,1-Dichloroethene	0.5 J															
1,2,4-Trimethylbenzene		0.24 J				0.23 J										
1,2-Dichlorobenzene						0.68 =			0.7 J							
1,3,5-Trimethylbenzene																
Benzene		0.35 =								0.54 J						
Chloroform																
Chloromethane			0.52 J				0.61 J					0.85 J				
cis-1,2-Dichloroethene	24 =	16 =	8.5 =	11 =	2.3 J	3.3 =	5 J	5.3 J	3.5 J	3.2 J			0.81 J			
Methylene chloride	9.1 =								0.82 J	0.85 J						
p-Isopropyltoluene																
Tetrachloroethylene				1.6 J	1.7 J	1.6 =	1.9 J	2.5 J	1.3 J		0.17 J		14 =			
trans-1,2-Dichloroethene		0.28 J														
Toluene			1 J				1.3 J					1.2 J			0.86 J	
Total Xylenes													1.8 J			
Trichloroethylene	300 =	7 =	8.2 =	12 =	4.5 J	7 =	7.9 =	10 =	6.4 =	9 =	0.21 J		3.2 J			11 =
Vinyl chloride																

NOTES
[1] for an organic analyte. The screening
GCTL and background screening value
Values in shaded cells meet or exceed
"=" qualifier indicates parameter detecte
"J" qualifier indicates an estimated valu
Empty cells indicate non-detects
NA indicates no screening criterion avai
B=qualifier indicated parameter detecte

Table 2-5
Summary of Detected Constituents
SA-36. NTC Orlando December 2000, March 2001, July 2001 and October 2001 Groundwater Sampling Results

IRA ANALYTICAL DATA
(CCI, 2002)

	OLD-36-26A 17-OLD-36-26A-Q4-01 C110599*2 P0110454-06 10/23/2001	OLD-36-26A 017-OLD-36-26A-Q3-01 AC17925 C108048*7 08/01/2001	OLD-36-26A 017-OLD-36-26A-Q1-01 AC09825 C103383*6 P0103235-08 03/14/2001	OLD-36-26A 017-OLD-36-26A-Q4-00 AC04276 12/01/2000	OLD-36-27A 17-OLD-36-27A-Q4-01 C110611*2 P0110454-09 10/24/2001	OLD-36-27A 017-OLD-36-27A-Q3-01 AC17883 C108004*1 07/31/2001	OLD-36-27A 017-OLD-36-27A-Q1-01 AC09719 C103316*3 P0103206-03 03/13/2001	OLD-36-27A 017-OLD-36-27A-Q4-00 AC04277 12/01/2000	OLD-36-28B 17-OLD-36-28B-Q4-01 C110611*3 P0110454-10 10/24/2001	OLD-36-28B 017-OLD-36-28B-Q3-01 AC17842 C107684*4 07/30/2001	OLD-36-28B 017-OLD-36-28B-Q1-01 AC09818 C103383*1 P0103235-01 03/14/2001	OLD-36-28B 017-OLD-36-28B-Q4-00 AC04278 12/01/2000	OLD-36-29B 17-OLD-36-29B-Q4-01 C110557*3 P0110454-03 10/22/2001	OLD-36-29B 017-OLD-36-29B-Q3-01 AC17841 C107684*3 07/30/2001	OLD-36-29B 017-OLD-36-29B-Q1-01 AC09718 C103316*2 P0103206-02 03/13/2001	OLD-36-29B 017-OLD-36-29B-Q4-00 AC04414 12/04/2000
Parameter																
Miscellaneous Parameters																
Acetic Acid		16 =				3.4 =				3.6 =						
Butyric Acid		4.6 =														
Propionic Acid	7.8 =	24 =			3.8 =	8.4 =			12 =	8.2 =						
Ethane	1000 =	5200 =	64 =		53 =	32 =	14 =		36 =	110 =	50 =		67 =	86 =	70 =	
Ethene	890 =	23000 =	120 =		130 =	95 =	57 =		230 =	210 =	110 =		730 =	120 =	70 =	
Methane	7700 =	2700 =	8.5 =		2200 =	650 =	1.7 =		4300 =	1500 =	3.6 =		1000 =	130 =	5 =	
Methane												0.012 =				
Alkalinity	3 =	16 =	18 =	26 =	350 =	140 =	62 =	160 =	57 =	49 =	37 =	300 =	8.5 =	12 =	11 =	27 =
Bromide				0.5 =												
Chloride	9.8 =	4.1 =	9.9 =	6.5 =	8.9 =	13 =	7.7 =	6.7 =	48 =	8.5 =	7 =	8.7 =	30 =	7.1 =	9.6 =	14 =
Dissolved Hydrogen	10 =				2.2 =				14 =				3.4 =			
Iron			540 =				360 =				1400 =				1500 =	
Iron, Dissolved	280 =	470 =			77 J	490 =			330 =	410 =			600 =	450 =		
Sodium				8.5 =				7.3 =				55 =				12 =
Sulfide	2.6 =	1.3 =	1.8 =		2.2 =	3.2 =			3.3 =	2.6 =				0.63 J		
Nitrate Nitrogen	0.16 =		0.02 =	1.2 =	2.8 =	1.26 =			0.19 =		0.01 =					
Nitrate-Nitrite Nitrogen	0.16 =				2.8 =				0.19 =							
Petroleum Range Organics (PRO)	0.19 =	22 =	2.7 B	0.57 JB			0.31 JB	0.49 JB			0.35 JB	0.4 JB			0.34 JB	
Total Dissolved Solids	42 =	94 J	61 =	260 =	230 =	310 J	91 =	230 =	340 =	180 J	270 =	920 =	140 =	10 J	68 =	180 =
Total Organic Carbon	19 =	76 =	25 =	46.6 =	18 =	31 =	3 =	8.36 =	48 =	21 =	6 =	90.5 =	9 =	6 =	12 =	5.18 =
Volatile Organic Constituents																
1,1-Dichloroethene													0.18 J			
1,2,4-Trimethylbenzene																
1,2-Dichlorobenzene																
1,3,5-Trimethylbenzene																
Benzene													0.19 J			
Chloroform												1.4 J				
Chloromethane			0.65 J													
cis-1,2-Dichloroethene	0.86 =				7.1 =	23 =		1.1 J	33 =	24 =		0.54 J	1.2 =	0.87 J		1.9 J
Methylene chloride			0.53 J				8.7 =				5.6 J				14 J	
p-Isopropyltoluene																
Tetrachloroethylene					0.4 =	0.55 J										190 =
trans-1,2-Dichloroethene									0.53 =							
Toluene		0.66 J				1 J				2 J				1.6 J		
Total Xylenes																
Trichloroethylene	4.8 =	6.3 =	10 =	15 =	1.5 =	14 =	97 =	79 =	6.8 =	30 =	66 =	85 =	110 =	130 =	150 =	
Vinyl chloride																

NOTES
[1] for an organic analyte. The screening
GCTL and background screening value
Values in shaded cells meet or exceed
"=" qualifier indicates parameter detecte
"J" qualifier indicates an estimated valu
Empty cells indicate non-detects
NA indicates no screening criterion avai
B=qualifier indicated parameter detecte

Table 2-5
Summary of Detected Constituents
SA-36. NTC Orlando December 2000, March 2001, July 2001 and October 2001 Groundwater Sampling Results

IRA ANALYTICAL DATA
(CCI, 2002)

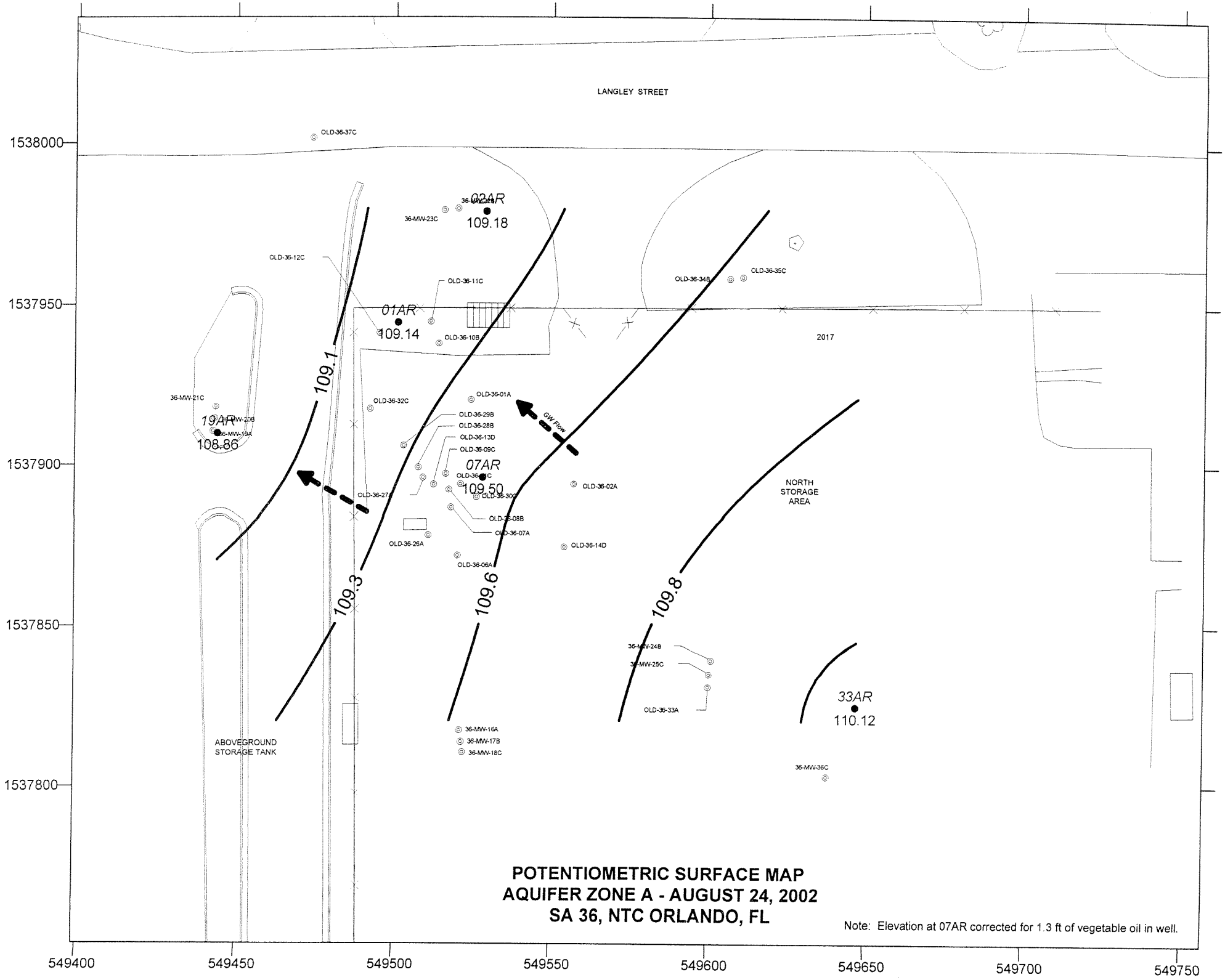
Parameter	OLD-36-30C 17-OLD-36-30C-Q4-01 C110599*3 P0110454-07 10/23/2001	OLD-36-30C 017-OLD-36-30C-Q3-01 AC17888 C108004*4 07/31/2001	OLD-36-30C 017-OLD-36-30C-Q1-01 AC09819 C103383*2 P0103235-02 03/14/2001	OLD-36-31C 17-OLD-36-31C-Q4-01 C110599*1 P0110454-05 10/23/2001	OLD-36-31C 017-OLD-36-31C-Q3-01 AC17885 C108004*3 07/31/2001	OLD-36-31C 017-OLD-36-31C-Q1-01 AC09820 C103383*3 P0103235-03 03/14/2001	OLD-36-31C 017-OLD-36-31C-Q4-00 AC04475 12/05/2000	OLD-36-32C 17-OLD-36-32C-Q4-01 C110557*4 P0110454-04 10/22/2001	OLD-36-32C 017-OLD-36-32C-Q3-01 AC17924 C108048*6 08/01/2001	OLD-36-32C 017-OLD-36-32C-Q1-01 AC09717 C103316*1 P0103206-01 03/13/2001	OLD-36-32C 017-OLD-36-32C-Q4-00 AC04566 12/06/2000	OLD-36-33A 017-OLD-36-33A-Q1-01 AC09959 03/16/2001	OLD-36-34B 017-OLD-36-34B-Q1-01 AC09957 03/16/2001	OLD-36-35C 017-OLD-36-35C-Q1-01 AC09956 03/16/2001	OLD-36-37C 017-OLD-36-37C-Q1-01 AC09958 03/16/2001
Miscellaneous Parameters															
Acetic Acid					15 =										
Butyric Acid					4.6 =										
Propionic Acid	9.9 =	3.8 =		2.8 =	31 =										
Ethane	180 =	92 =	37 =	58 =	44 =	84 =		260 =	39 =	19 =					
Ethene	1000 =	300 =	78 =	410 =	260 =	270 =		250 =	42 =	31 =					
Methane	1300 =	90 =	5.1 =	1400 =	2300 =	400 =		7.5 =	5.7 =	1.8 =					
Methane															
Alkalinity	9 =	20 =	25 =		1 =	26 =	18 =	9 =	11 =	26 =	83 =				
Bromide															
Chloride	11 =	7.4 =	8 =	9.9 =	5.4 =	6.9 =	8.9 =	11 =	6 =	7.8 =	7.9 =				
Dissolved Hydrogen	14 =			8.7 =				1.5 =							
Iron			560 =			1100 =				330 =					
Iron, Dissolved	500 =	350 =		250 =	570 =			190 =	210 =						
Sodium							9.2 =				16 =				
Sulfide	1.6 =	3.1 =		2.7 =	2.8 =	1.4 =									
Nitrate Nitrogen	0.16 =		0.02 =	0.15 =				0.11 =							
Nitrate-Nitrite Nitrogen	0.16 =			0.15 =				0.11 =							
Petroleum Range Organics (PRO)			0.38 JB		3.2 =	5.9 =	0.4 =			0.26 JB					
Total Dissolved Solids	52 =	92 J	110 =	30 =	120 J	140 =	130 =	64 =	59 J	200 =	620 =				
Total Organic Carbon	12 =	8 =	1 =	7.1 =	31 =	49 =	6.41 =	6.4 =	6 =	7 =	18.5 =				
Volatile Organic Constituents															
1,1-Dichloroethene															
1,2,4-Trimethylbenzene															
1,2-Dichlorobenzene															
1,3,5-Trimethylbenzene															0.65 J
Benzene															24 =
Chloroform							0.97 J								
Chloromethane					0.59 J				0.68 J						
cis-1,2-Dichloroethene	27 =	14 =	1.3 J	2.8 =	17 =			0.25 J							
Methylene chloride			0.6 J			0.57 J	1.8 =				0.85 J	0.65 J	0.52 J	0.53 J	
p-Isopropyltoluene															
Tetrachloroethylene								0.22 J							
trans-1,2-Dichloroethene	0.37 =														
Toluene		1.1 J			2.5 J				0.69 J						
Total Xylenes															
Trichloroethylene	12 =	18 =	57 =	13 =	34 =	13 =	14 =	12 =	20 =	13 =	17 =				
Vinyl chloride															

NOTES
[1] for an organic analyte. The screening
GCTL and background screening value
Values in shaded cells meet or exceed
"=" qualifier indicates parameter detecte
"J" qualifier indicates an estimated valu
Empty cells indicate non-detects
NA indicates no screening criterion avai
B=qualifier indicated parameter detecte

IRA ANALYTICAL DATA
CHEMICALS DETECTED IN REPLACEMENT WELLS
(CCI, 2002)

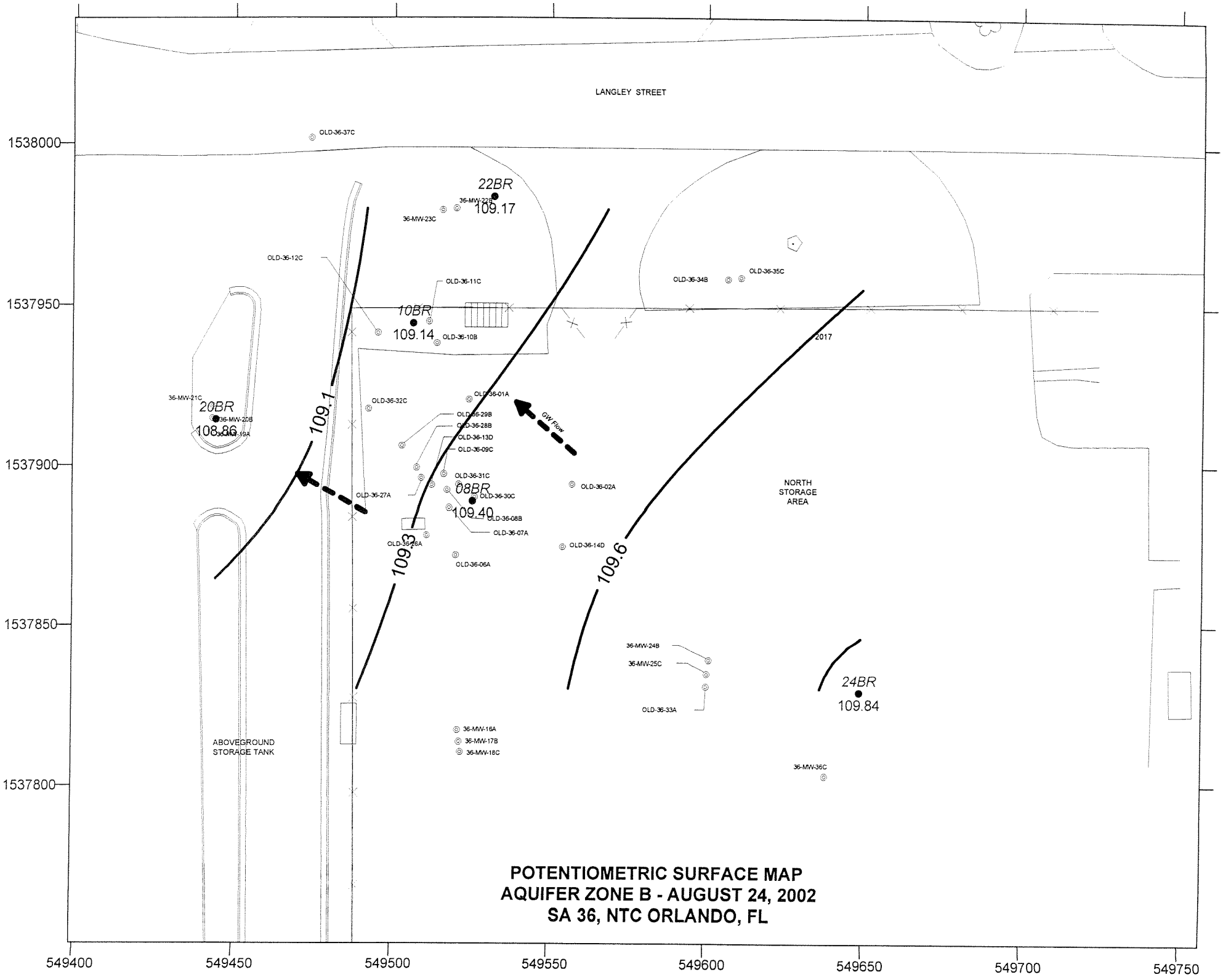
Station ID:			OLD-36-01AR	OLD-36-02AR	OLD-36-08BR	OLD-36-09CR	OLD-36-10BR	OLD-36-11CR	OLD-36-18CR	OLD-36-19AR	OLD-36-20BR	OLD-36-22BR	OLD-36-23CR	OLD-36-24BR	OLD-36-25CR	OLD-36-33AR	OLD-36-35CR	OLD-36-36CR
Client Sample ID:			17-3601ARQ202	17-3602ARQ202	173608BRQ202	173609CRQ202	17-3610BRQ202	173611CRQ202	173618CRQ202	17-3619ARQ202	17-3620BRQ202	17-3622BRQ202	17-3623CRQ202	17-3624BRQ202	17-3625CRQ202	17-3633ARQ202	17-3635CRQ202	17-3636CRQ202
Lab Sample ID:		Screening	20205080306	20205092202	20206010601	20206010602	20205080305	20206010603	20206010605	20205080303	20205080304	20205092203	20205092201	20205101101	20205101106	20205092205	20205101107	20205101102
Lab Sample ID:		Criteria*																
Lab Sample ID:																		
Date Collected:			05/07/2002	05/08/2002	05/31/2002	05/31/2002	05/07/2002	05/31/2002	05/31/2002	05/07/2002	05/07/2002	05/08/2002	05/08/2002	05/09/2002	05/09/2002	05/08/2002	05/09/2002	05/09/2002
Parameter	**Units**																	
Miscellaneous Parameters																		
Ethane	ng/L	--			2150													
Ethene	ng/L	--																
Methane	ug/L	--	1410	5.96	5810 J	1310	1320	23	22.4			197 J	331 J	159 J		54.4	1100	204 J
Methane	ug/mL	--																
Alkalinity	mg/L	--	28	36.5		12.2	86.4	19.8	18.2	14.8	17.8	2.8	3.8				194	
Bromide	mg/L	--																
Chloride	mg/L	250000	6.36	8.29	6.31	10.3	4.38	6.43	7.02	3.05	2.93	5.9	10.2	4.31	3.23	5.16	20.9	4.61
Dissolved Hydrogen	nM	--																
Iron	ug/L	*1227***	79 J	50 J	**1440**	1170	440	530	630	11 J	78 J	140	1220	280	790	69 J	350	**1340 J**
Sulfide	mg/L	--					0.065					0.079		0.142				0.135
Nitrite Nitrogen	mg/L	10000	0.027	0.046	5	0.2	1.39	0.02	0.43 J	0.029	0.077	0.1		0.069				0.33
Nitrate Nitrogen	mg/L	10000	1.76	1.7						2.52								
Petroleum Range Organics (PRO)	mg/L	5000			1.03												1.27	
Total Dissolved Solids	mg/L	500000	102	135	1310	176	280	125	649 J	67	93	68		109	110	92	310	270
Total Organic Carbon	mg/L	--			35		48.3					18.2					48.5	15.8
Volatile Organic Constituents																		
1,1,2,2-Tetrachloroethane	ug/L	0.2				**0.817**												
1,1-Dichloroethene	ug/L	7																
1,2-Dibromo-3-chloropropane	ug/L	0.2				**2.03 J**		**1.42 J**										
1,2-Dichloroethane	ug/L	3											**3.22**					
2-Butanone	ug/L	4200			10.4			3.69 J										
2-Hexanone	ug/L	280						1.34 J										
4-Methyl-2-pentanone	ug/L	560						1.4 J										
Benzene	ug/L	1											**168**					
Bromodichloromethane	ug/L	0.6				**1.33 J**			**2.02 J**									
Chloroform	ug/L	5.7				4.34 J			**6.39**									1.01 J
cis-1,2-Dichloroethene	ug/L	70	1.85 J		4.75 J		1.27 J	1.57 J				4.12 J						
Ethylbenzene	ug/L	30											1.82 J					
tert-Butyl methyl ether (MTBE)	ug/L	50											**62.9**					
Tetrachloroethylene	ug/L	3										**3.66**	1.34 J					
Trichloroethylene	ug/L	3	1.57 J		**54**	**25.3**	1.06 J	1.43 J				**3.54**						1.66 J

Notes:
Only chemicals detected are listed; only detections are shown.
Bold and shaded results exceed the screening criteria.
"J" flag indicates result is less than laboratory reporting limit, but greater than detection limit.
* For an organic analyte, the screening criterion is the GCTL (FDEP, 1999); for an inorganic analyte with an established GCTL and BGSV (ABB-ES, 1995b), the screening criterion is the greater of the GCTL or the BGSV. Analytes with no GCTL are not considered to have exceedances.
** Background Screening Value (HLA, 1995); iron concentrations did not exceed the maximum background sample concentration of 1540 ug/L.

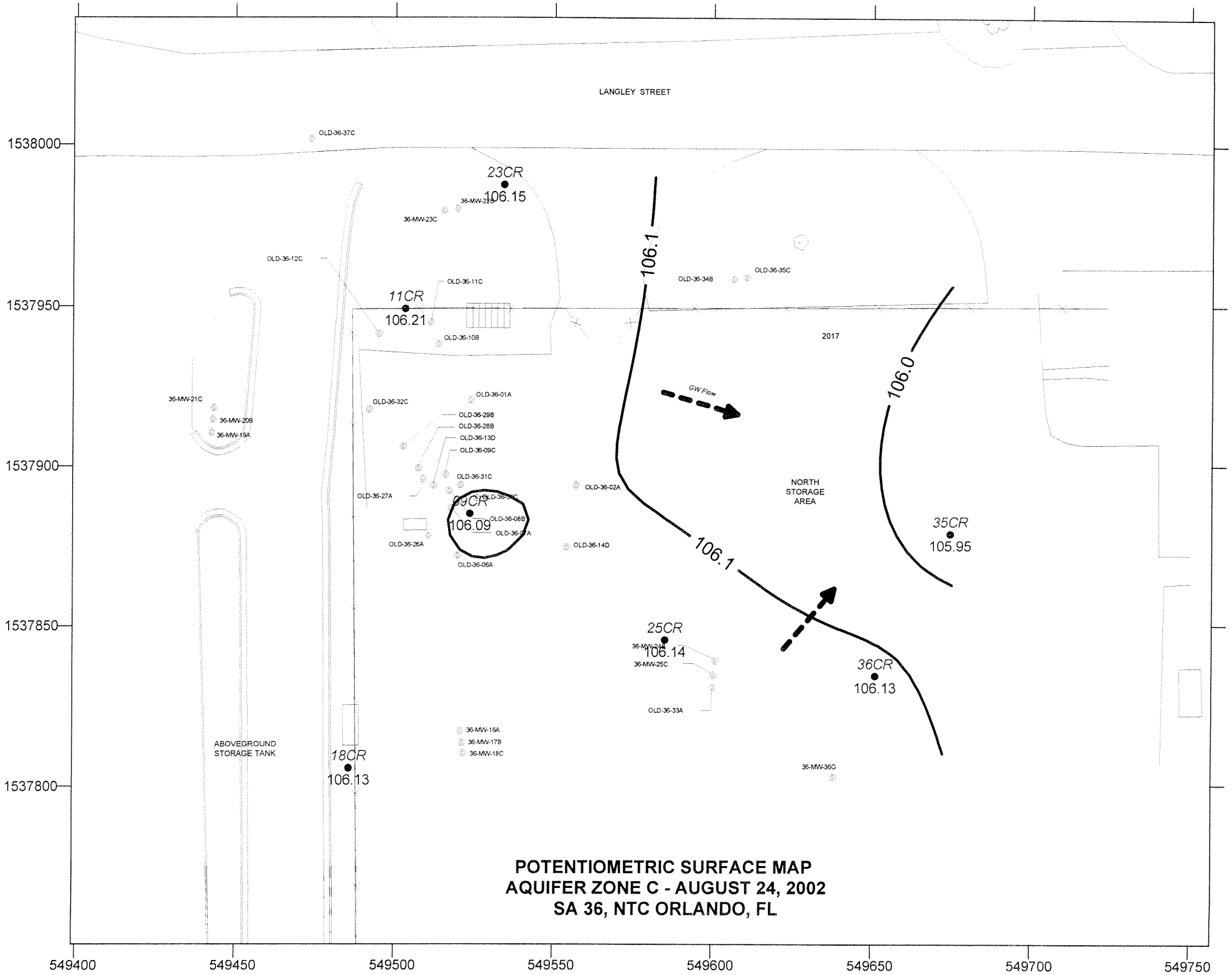


POTENTIOMETRIC SURFACE MAP
AQUIFER ZONE A - AUGUST 24, 2002
SA 36, NTC ORLANDO, FL

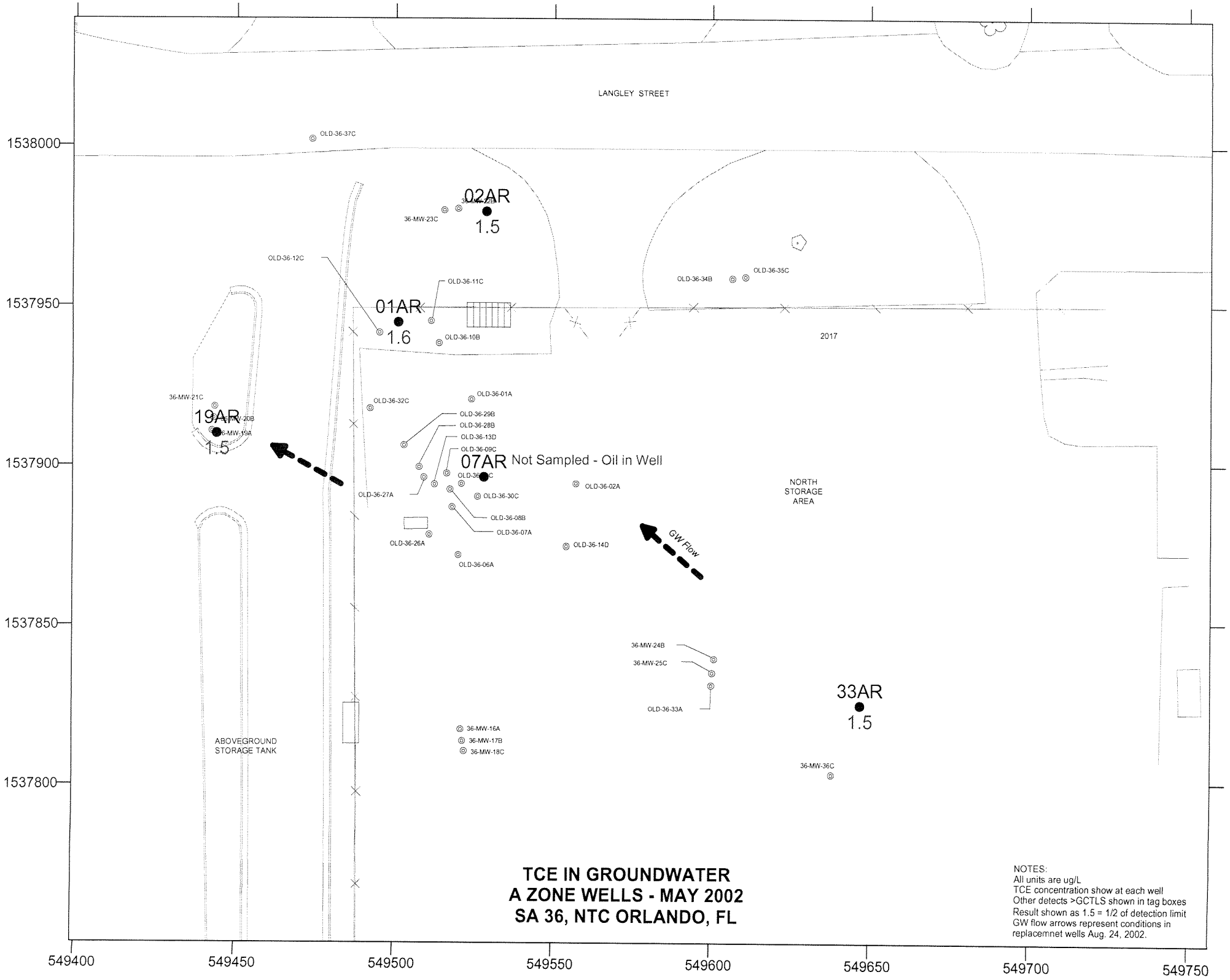
Note: Elevation at 07AR corrected for 1.3 ft of vegetable oil in well.



POTENTIOMETRIC SURFACE MAP
AQUIFER ZONE B - AUGUST 24, 2002
SA 36, NTC ORLANDO, FL

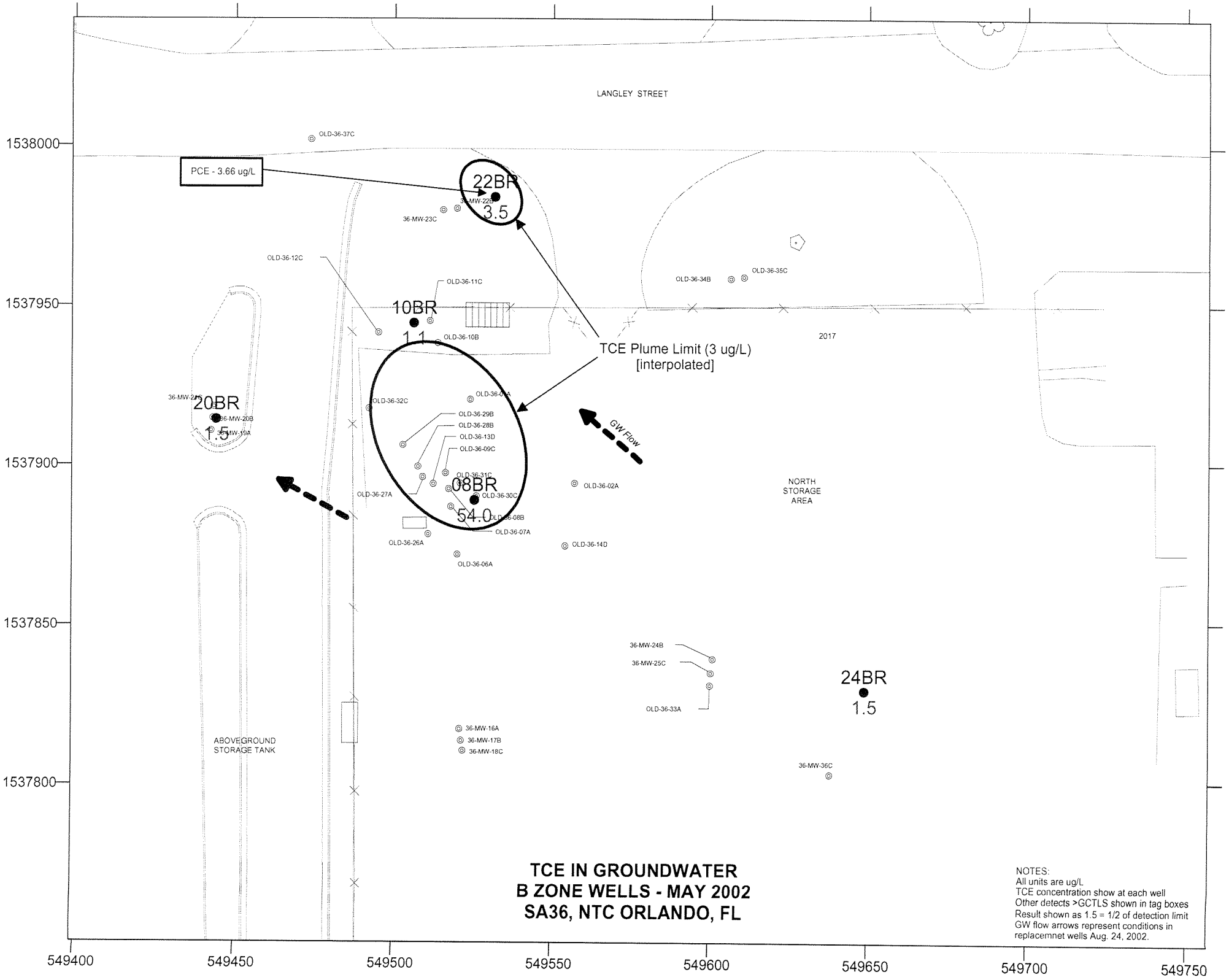


POTENTIOMETRIC SURFACE MAP
AQUIFER ZONE C - AUGUST 24, 2002
SA 36, NTC ORLANDO, FL



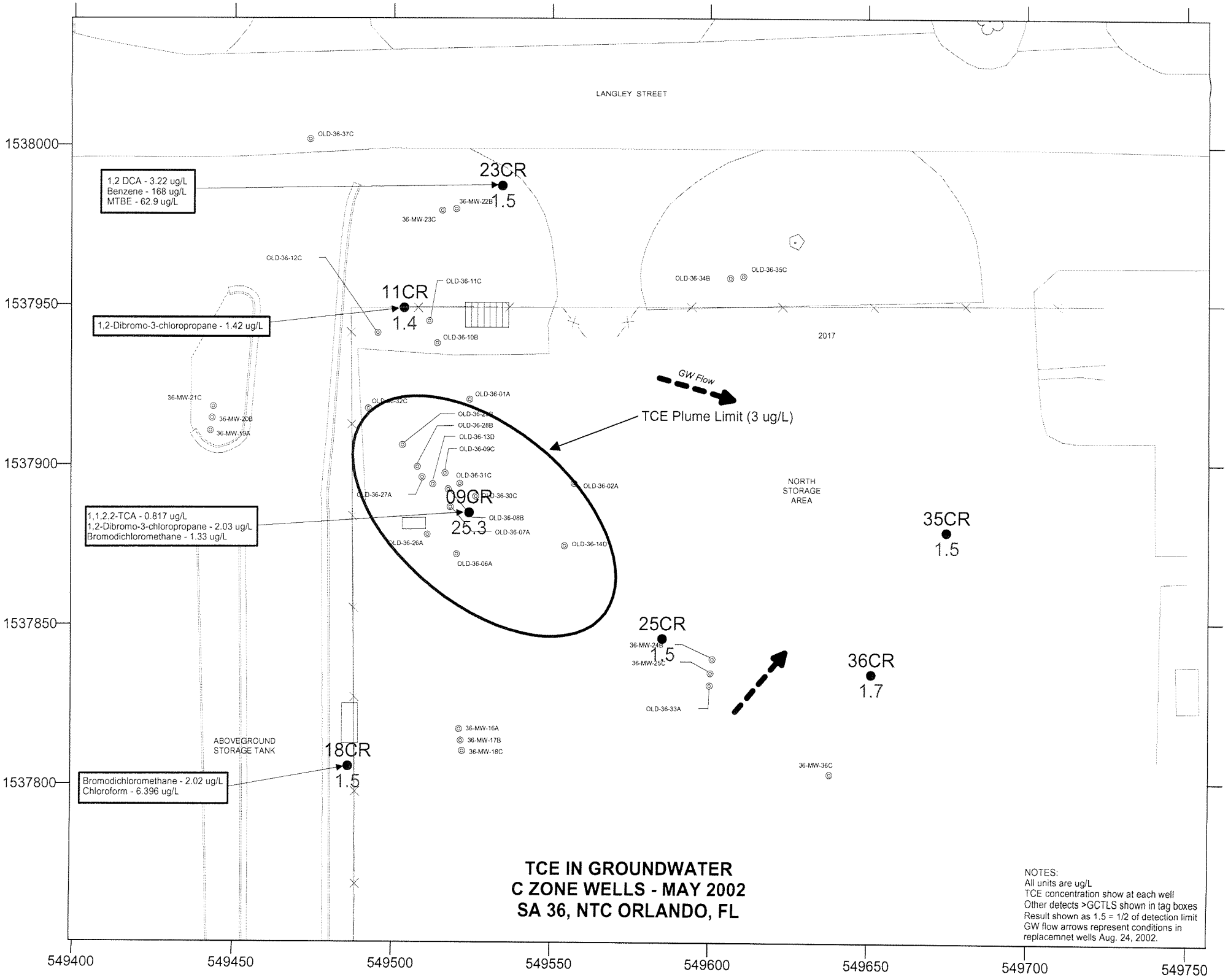
TCE IN GROUNDWATER
A ZONE WELLS - MAY 2002
SA 36, NTC ORLANDO, FL

NOTES:
All units are ug/L
TCE concentration show at each well
Other detects >GCTLS shown in tag boxes
Result shown as 1.5 = 1/2 of detection limit
GW flow arrows represent conditions in replacemnet wells Aug. 24, 2002.



TCE IN GROUNDWATER
B ZONE WELLS - MAY 2002
SA36, NTC ORLANDO, FL

NOTES:
All units are ug/L
TCE concentration show at each well
Other detects >GCTLS shown in tag boxes
Result shown as 1.5 = 1/2 of detection limit
GW flow arrows represent conditions in replacemnet wells Aug. 24, 2002.



TCE IN GROUNDWATER
C ZONE WELLS - MAY 2002
SA 36, NTC ORLANDO, FL

NOTES:
All units are ug/L
TCE concentration show at each well
Other detects >GCTLS shown in tag boxes
Result shown as 1.5 = 1/2 of detection limit
GW flow arrows represent conditions in replacemnet wells Aug. 24, 2002.

APPENDIX E

GROUNDWATER FLOW CALCULATIONS
(TtNUS, 2002)

CLIENT NTC Orlando, Study Area 36		JOB NUMBER N7457
SUBJECT Groundwater and Contaminant Velocity Calculations		
BASED ON See Below		DRAWING NUMBER
BY A. Jenkins	CHECKED BY P. Juriasingani	DATE 04/05/02

GROUNDWATER FLOW CALCULATIONS

Problem: Determine the groundwater seepage velocity, contaminant velocity, and dissolved vegetable oil velocity for the A, B, and C aquifer zones at SA-36.

Solution: The following formulas may be used to calculate the desired velocities.

GW Seepage Velocity, Vs = Ki/Ne

Where K = hydraulic conductivity
i = hydraulic gradient
Ne= aquifer effective porosity

Contaminant Velocity, Vc = Vs/R

Where R, coefficient of retardation = 1 + (Db)(Kd)/N

Where Db = aquifer dry bulk density
Kd = partition coefficient
N = aquifer total porosity

The above formulas are based on advection and adsorption/desorption of contaminants, but ignore the potential effects of dispersion and biodegradation.

It is assumed for the purposes of this calculation that dissolved vegetable oil (representative chemical formula, $C_{18}H_{34}O_3$) will move through the aquifer at a retarded rate similar to contaminants that fall under the category of Total Recoverable Petroleum Hydrocarbons (i.e., $C_5 - C_{40}$ range). Therefore, the above contaminant velocity formula will be applied to the dissolved vegetable oil velocity.

Given: Two sets of water level measurements (July and October 2001) were used to map the potentiometric surfaces for the A, B, and C aquifer zones at SA-36. Based on these contour maps, the following horizontal hydraulic gradients were determined:

Aquifer Zone	July Gradient	October Gradient	Average Gradient
A	0.008	0.006	0.007
B	0.009	0.007	0.008
C	0.0015	0.0019	0.0017

CLIENT NTC Orlando, Study Area 36		JOB NUMBER N7457
SUBJECT Groundwater and Contaminant Velocity Calculations		
BASED ON See Below		DRAWING NUMBER
BY A. Jenkins	CHECKED BY P. Juriasingani	DATE 04/05/02

Slug tests were conducted at the site by CCI during December 2000 as part of the implementation of the IRA. The following hydraulic conductivity results were derived from the slug test analyses:

Aquifer Zone	K, average (ft/day)
A	6.3
B	6
C	4.4

The total porosity and effective porosity, and the dry bulk density of the aquifer formation at SA-36 have not been determined by site specific testing or analyses of samples. Therefore, the following literature values for fine sand (Wiedemeier, et al, 1996), which is the predominant aquifer material for aquifer Zones A and C, will be used for the velocity calculations:

Parameter (Zones A & C)	Range	Value Used
Total Porosity	0.26 – 0.53	0.35
Effective Porosity	0.1 – 0.3	0.25
Dry Bulk Density	1.37 – 1.81 g/cc	1.7 g/cc

Because aquifer zone B contains more silt and clay and is cemented, the material is assumed to have greater total porosity, lower effective porosity, and to have somewhat lower dry bulk density. The following literature values for silt and clay will be used for the velocity calculations:

Parameter (Zone B)	Range	Value Used
Total Porosity	0.34 – 0.61	0.45
Effective Porosity	0.1 – 0.2	0.2
Dry Bulk Density	1 – 2.4 g/cc	1.4 g/cc

The primary contaminants of concern (COCs) for transport through the aquifer at SA-36 are PCE, TCE, and DCE. Also, vegetable oil has been injected as a source for dissolved organic carbon in the aquifer to enhance microbial degradation of the COCs. To calculate the velocity of these constituents it is necessary to determine the partition coefficient, Kd, for each. The Kd can be estimated as the octanol-water partitioning coefficient, Koc, for each constituent multiplied by the fraction of organic carbon, foc, in the aquifer. Published values (FDEP 1999) of Koc for the above constituents are as follows:

CLIENT NTC Orlando, Study Area 36		JOB NUMBER N7457
SUBJECT Groundwater and Contaminant Velocity Calculations		
BASED ON See Below		DRAWING NUMBER
BY A. Jenkins	CHECKED BY P. Juriasingani	DATE 04/05/02

Constituent	Koc (L/kg)
PCE	1.55 E+02
TCE	1.66 E+02
cis-1,2-DCE	3.55 E+01
Vegetable Oil	1.58 E+03*

Koc value for vegetable oil was not found; surrogate value for Total Recoverable Petroleum Hydrocarbons is shown for calculations purposes.

A site-specific concentration for foc in the aquifer at SA-36 has not been determined. The BioScreen Model documentation reports that a typical range is 0.0002 to 0.02. ASTM (1995) states that if the site foc is unknown, a value of 0.001 is often used.

Calculations:

Groundwater Seepage Velocity, Vs:

Aquifer Zone	K (ft/day)	Gradient	Ne	Vs (ft/day)	Vs (ft/year)
A	6.3	0.007	0.25	0.18	64
B	6	0.008	0.2	0.24	88
C	4.4	0.0019	0.25	0.030	11

Contaminant Seepage Velocity, Vc:

Aquifer Zone A	Vs (ft/day)	Db (g/cc)	Kd (L/kg)*	N	R	Vc (ft/day)	**Vc (ft/year)**
PCE	0.18	1.7	0.155	0.35	1.8	0.10	**36**
TCE	0.18	1.7	0.166	0.35	1.8	0.10	**36**
***cis*-DCE**	0.18	1.7	0.036	0.35	1.2	0.15	**53**

Aquifer Zone B	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vc (ft/day)	**Vc (ft/year)**
PCE	0.24	1.4	0.155	0.45	1.5	0.16	**59**
TCE	0.24	1.4	0.166	0.45	1.5	0.16	**59**
***cis* -DCE**	0.24	1.4	0.036	0.45	1.1	0.22	**80**

Aquifer Zone C	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vc (ft/day)	**Vc (ft/year)**
PCE	0.03	1.7	0.155	0.35	1.8	0.02	**6**
TCE	0.03	1.7	0.166	0.35	1.8	0.02	**6**
***cis* -DCE**	0.03	1.7	0.036	0.35	1.2	0.03	**9**

* Kd = Koc X foc

CLIENT NTC Orlando, Study Area 36		JOB NUMBER N7457
SUBJECT Groundwater and Contaminant Velocity Calculations		
BASED ON See Below		DRAWING NUMBER
BY A. Jenkins	CHECKED BY P. Juriasingani	DATE 04/05/02

Dissolved Vegetable Oil Seepage Velocity, Vo:

Aquifer Zone A	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vo (ft/day)	**Vo (ft/year)**
Dissolved Oil	0.18	1.7	1.58	0.35	8.7	0.02	**7**

Aquifer Zone B	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vo (ft/day)	**Vo (ft/year)**
Dissolved Oil	0.24	1.4	1.58	0.45	5.9	0.04	**15**

Aquifer Zone C	Vs (ft/day)	Db (g/cc)	Kd (L/kg)	N	R	Vo (ft/day)	**Vo (ft/year)**
Dissolved Oil	0.03	1.7	1.58	0.35	8.7	0.003	**1.3**