Via Email

June 14, 2017

Department of Environmental Quality
Division of Waste Management
Hazardous Waste Section
1646 Mail Service Center
Raleigh, NC 27699-1646

Attn: Mary Siedlecki

Re: Corrective Measures Work Plan
Petty Machine Company – NCD991278805
Gastonia, North Carolina
H&H Job No. PTY-001

Dear Ms. Siedlecki:

Hart & Hickman, PC (H&H) has prepared this letter in response to your comments to the Corrective Measures Work Plan submitted for the above referenced site on May 10, 2017. This work plan proposed using enhanced reductive dechlorination (ERD) to treat volatile organic compounds (VOCs) in the source area and using monitored natural attenuation (MNA) to treat downgradient impacts. In your letter dated June 5, 2017, you approved the proposed corrective action for the site with some comments. Your comments and action items are presented on the following pages, with our responses in red. A revised Corrective Measures Work Plan is also included. Please do not hesitate to contact us at (919) 847-4241 if you have any questions.

Sincerely,

Hart & Hickman, PC

Leonard Moretz, PG
Senior Consultant

Jason Tillotson, PE
Project Engineer

cc: Larry Petty, Petty Machine Company (via email)

Comment

Section 2.5.1: The Corrective Measures Work Plan indicates that monitoring data from select monitoring wells were fit to an exponential decay function graphic. This information was used to estimate the downgradient extent of VOC contamination on the offsite property. This graphic was not included in the document.

Action Item

Insert the graphic into Appendix B.

Response

This graph has been inserted at the end of Appendix B.

Comment

Section 2.5.2: The Corrective Measures Work Plan discusses the magnitude and distribution of 1,4-dixoane in groundwater. The document indicates that although 1,4-dioxane is present in groundwater at the site, the proposed corrective action has been selected based on VOC concentrations, which are generally 20 to 100 times greater in magnitude than 1,4-dioxane. The Section concurs that VOCs should be the primary driver in evaluating and selecting potential remedial strategies and consequently does not require that 1,4-dioxane be actively remediated at this time.

Action Item

The document should state that in the event site conditions change or remedial technologies become more effective and cost effective at addressing 1,4-dioxane in the environment, the corrective action may be amended or augmented to address 1,4-dixoane.

Response

The following paragraph was added to the end of Section 2.5.2:

> Although 1,4-dioxane is a concern at the Site, it is not considered the primary driver of corrective action because it is generally 20 to 100 times lower than total CVOC concentrations. Therefore, corrective actions taken at the site will not focus on 1,4-dioxane at this time. However, in the event that site conditions change and/or technologies for remediating 1,4-dioxane become more efficient and cost effective, the corrective action may be amended to address 1,4-dioxane.

Comment

Section 2.5.3: The Corrective Measures Work Plan suggests that the presence of chromium in groundwater collected from MW-4 may reflect background conditions. Review of the data compilation presented in Table 8 does not provide convincing evidence to support Section agreement.

The Section does, however, agree that chromium concentrations are decreasing. Furthermore, a Declaration of Perpetual Land Use Restrictions will be recorded on the property preventing potential human exposures to chromium in soil and groundwater. Therefore, the Section concurs that continued monitoring of chromium concentrations in MW-4 and MW-11 is no longer warranted.

Action Item

All references to chromium in groundwater collected from MW-4 as being representative of background conditions should be deleted. Furthermore, although the Corrective Measures Work Plan concludes that chromium is not a major concern at the site, the document does not discuss or defend discontinuation of groundwater monitoring. The Corrective Measures Work Plan should clearly and concisely justify the discontinuation of groundwater monitoring for chromium. The document may reference the Declaration of Perpetual Land Use Restrictions as

an indirect means to prevent potential exposures and thereby safeguard human health and the environment.

Response

Exceedances of chromium are no longer referred to as potentially background in origin. The following paragraph has been added to the end of Section 2.5.3:

> Chromium does not appear to be a major concern at the Site, and as such will not be addressed in this CM Work Plan. In addition, H&H recommends discontinuing monitoring for chromium during future sampling events. Chromium concentrations have only been detected above the 2L Standard consistently in on-Site monitoring wells MW-4 and MW-11. Concentrations in both wells are decreasing over time, and chromium has not exceeded the 2L Standard in MW-11 during the two most recent sampling events. Chromium has not been detected in off-Site wells. Additionally, a Declaration of Perpetual Land Use Restrictions is currently being prepared for the Site that will prevent exposure to potentially contaminated soil and groundwater.

The following paragraph discussing the land use restrictions was also added to Section 2.2:

> A Declaration of Perpetual Land Use Restrictions is currently being prepared for the Site. These restrictions seek to limit on-Site exposure to potentially contaminated soil and groundwater. These restrictions will include limiting future site use to commercial or industrial purposes, prohibiting the use of Site groundwater for any purposes, and preventing disturbance of Site soil without prior approval from NCDEQ HWS.

Comment

Section 4: Table 11 summarizes the proposed groundwater performance monitoring plan. This is a typographic error. The correct reference is Table 10.

Action Item

Revise the text to reference Table 10.

Response

The reference in Section 4.0 has been corrected.

Comment

Section 4: A thorough description of proposed baseline and performance monitoring is presented. Surface water monitoring is included in the performance monitoring protocols. The Section suggests that surface water samples be collected at 12 and 24 months following implementation of the corrective action. If contaminant concentrations measured in surface water samples remain consistently below 15A NCAC 2B Surface Water Standards, and conditions warrant a change, surface water sampling may be discontinued.

Action Item

Revise the text of Section 4 and Table 10 to reflect the proposed change to surface water sampling protocols.

Response

Tables 10 and 11 have been corrected to remove surface water samples after 24 months of performance monitoring. The information in the costing section has also been updated to reflect the change. The following paragraph has been added to Section 4.2:

Surface water samples SW-1 through SW-4 will be collected and analyzed during the 12 month and 24 month monitoring events. Concentrations of VOCs have previously been detected in surface water samples; however, they have consistently been below 2B Surface Water Standards. If surface water concentrations remain below 2B Standards, surface water sampling will be discontinued following the 24 month performance monitoring event.

Comment

Section 4: As noted above, Section 4 presents sampling protocols to evaluate baseline and performance monitoring. Changes in sampling protocols are warranted to evaluate corrective action efficacy. The Section fully agrees with the proposed changes.

Although in full agreement, the Section notes that the proposed changes differ from those described in the Sampling and Analysis Plan (revised May 3, 2010)

Action Item

There is no revision to Corrective Measures Work Plan required. The Section will draft a separate letter addressing this issue. In that letter, the Section will reference the new sampling plan and indicate the location where it can be found for future reference.

Response

No action required. NCDEQ will draft a separate letter addressing the change to the Sampling and Analysis Plan. This letter will utilize the updated sampling plan reflected in this revised Work Plan.

Comment

Figures: The legend that appears on Figures 5, 13, and 15 is misleading. Figure 6 is used to suggest the presence of preferential flow paths.

Action Item

Either delete the legend or revise Figures 5, 13, and 15 to illustrate the lithologic units. Figure 13 may more correctly suggest the presence of preferential flow paths (as opposed to Figure 6

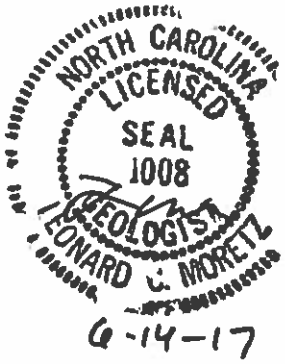
Response

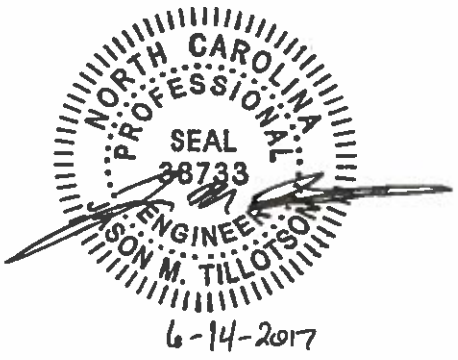
The cross-sections in Figures 5, 10, 13, and 15 have been updated to include lithological data. The reference to preferential flow paths in Section 2.5.2 has been updated from Figure 6 to Figures 12 and 13.

Corrective Measures Work Plan

Petty Machine Company
Gastonia, North Carolina

H&H Job No. PTY-001
June 14, 2017
Revision #1





hart hickman

SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street, Suite 100
Charlotte, NC 28203
704.586.0007 main

3334 Hillsborough Street
Raleigh, NC 27607
919.847.4241 main

www.harthickman.com

Corrective Measures Work Plan – Revision #1
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Table of Contents

List of Tables

List of Figures

List of Appendices

Corrective Measures Work Plan – Revision #1
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

1.0 Introduction

This Corrective Measures (CM) Work Plan has been prepared by Hart & Hickman, PC (H&H) on behalf of Petty Machine Company, Inc. (PMC) to describe proposed remedial actions for the PMC facility (Site) located at 2403 Forbes Road in Gastonia, North Carolina. A Site location map is provided in Figure 1, and a Site layout is provided in Figure 2. The Site is located on a 15-acre parcel approximately 5 miles south of Gastonia and is bordered to the west by US Highway 321, to the south by Forbes Road, to the north by the AB Carter, Inc. industrial facility, and to the east by undeveloped private property. The Site is currently regulated by the North Carolina Department of Environmental Quality (NCDEQ) Division of Waste Management (DWM) Hazardous Waste Section (HWS) and has been assigned the facility ID number NCD991278805. A brief summary of the Site is included in the following sections.

1.1 Site Background

PMC has operated at the Site since 1966 and specializes in producing custom process machines and machine parts. Current and former manufacturing processes have included machining, finishing, and equipment assembly. From the late 1970s until 1991, the finishing practices included chrome and nickel plating.

In 1989, groundwater samples collected beneath a former waste holding tank indicated the presence of chlorinated solvents. Following removal of the holding tank in 1992, soil samples indicated the presence of certain metals (barium, lead, and chromium) and tetrachloroethene (PCE). Since 1992, sixteen monitoring wells and eight piezometers have been installed to evaluate groundwater quality and flow conditions at the Site. The following volatile organic compounds (VOCs) have consistently been detected above NCAC 2L Groundwater Standards (2L Standards): 1,1,1-trichloroethane (1,1,1-TCA); trichloroethene (TCE); 1,1-dichloroethane (1,1-DCA);

1,1-dichloroethene (1,1-DCE); cis-1,2-dichloroethene (cis-1,2-DCE); and 1,4-dioxane. The metal chromium has also been detected above its 2L Standard.

1.2 SWMUs and AOCs

Eleven solid waste management units (SWMUs) and three areas of concern (AOCs) were identified in the Facility Assessment Report (Booz Allen Hamilton 2009). Table 1 lists the SWMUs and AOCs and Figure 3 shows the locations of the SWMUs and AOCs. SWMU 2 was closed as a landfill in 1995. No further action (NFA) was recommended for SWMUs 3 through 11 in the Facility Assessment Report and subsequently approved by NCDEQ. A Facility Characterization Report (S&ME 2016) recommended perpetual land use restrictions (LURs) and NFA for SWMU 1, AOC 2, and AOC 3. The LURs and NFAs were approved by NCDEQ in a letter dated June 17, 2016. As such, only AOC 1 (TCE Surface Release Area) will be discussed further.

AOC 1 is located outside on the northeastern portion of the facility. The exact location and size of the release area is unknown. As stated in the Facility Assessment Report, "a former employee was witnessed disposing of [TCE] by pouring it directly onto the ground outside of the Former Metal Plating Building (SWMU 1). The quantity of TCE that was released is unknown as well as the frequency at which these releases occurred." Groundwater samples collected in the vicinity of AOC 1 indicate parts per million level concentrations of TCE, cis-1,2-DCE, and 1,1-DCE.

1.3 Report Organization

The objective of this CM Work Plan is to propose corrective measures for the remaining groundwater contamination at the Site. The report is divided into the following sections:

- Section 2 – Site Conceptual Model: Includes a review of the Site conceptual model, including Site geology and hydrogeology, downgradient receptors, and impacted media (soil, groundwater, and indoor air)
- Section 3 – Corrective Measures: Provides an in-depth description of the proposed corrective measures, including remedial technology and remedial design

- Section 4 – Monitoring and Reporting: Reviews the proposed performance monitoring and reporting schedule
- Section 5 – Cost Estimate: Estimates costs for corrective measures implementation, monitoring, and reporting for the 30 year anticipated clean-up timeframe

2.0 Site Conceptual Model

2.1 Site Geology and Hydrogeology

The Site is located within the Charlotte Belt of the Piedmont Physiographic Province. The geology in the area consists of meta-sedimentary and meta-volcanic rocks, as well as igneous intrusive rocks such as diorite and granite. The soil immediately under the Site has been weathered to residuum and saprolite. Based on soil borings at the Site, depth to bedrock can range from 8 to 90 feet below land surface (ft bls). Bedrock at the Site consists of schist, quartzite, and granite. A geologic cross-section location is shown in Figure 4, and the geologic cross-section is shown in Figure 5.

Monitoring well construction details and groundwater elevation data at the Site are included in Table 2. Groundwater at the Site typically ranges from approximately 20 to 40 ft bls, with groundwater depths typically highest near the facility buildings. Groundwater generally flows beneath the Site to the east (Figure 6). In August 2016, S&ME conducted rising- and falling-head slug tests to estimate hydraulic conductivity in three shallow (MW-2, MW-5, and MW-8) and two intermediate (MW-7A and MW-7B) monitoring wells. The slug test data is included in Appendix A. The calculated hydraulic conductivity in shallow wells ranged from 0.28 feet per day (ft/d) at MW-8 to 25 ft/d at MW-2, with a geometric mean of 4.8 ft/d. Previous slug testing in February 1993 at shallow wells MW-1, MW-2, and MW-4 produced a geometric mean hydraulic conductivity of 0.33 ft/d. The calculated hydraulic conductivity in August 2016 for intermediate wells ranged from 2.4 ft/d at MW-7A to 15 ft/d at MW-7B.

Based on groundwater levels from May 2016, the lateral hydraulic gradient was 0.026 feet per foot (ft/ft) in the shallow aquifer and 0.021 ft/ft in the intermediate aquifer. Assuming an effective porosity of 0.3, the estimated groundwater velocity using the August 2016 hydraulic conductivities was 150 feet per year (ft/yr) in the shallow aquifer and 140 ft/yr in the intermediate aquifer. However, if the February 1993 hydraulic conductivity was used, the estimated groundwater velocity in the shallow aquifer would be 10 ft/yr.

Vertical hydraulic gradients were calculated for well clusters MW-5/7A/7B, MW-9/9A, MW-10/10A, and MW-11/11A. Groundwater elevation data from May 2015, October 2015, May 2016, and November 2016 were used to ensure the robustness of the calculated vertical gradients. Vertical gradient calculations are provided in Table 3. Vertical gradients are inconsistent across the Site. Vertical gradients at well clusters MW-5/7A/7B and MW-9/9A were consistently downward, while the vertical gradient at well cluster MW-11/11A was consistently upward. The vertical gradient at well cluster MW-10/10A was upward during some events and downward during others.

The vertical extent of the groundwater contaminant plume at the Site was addressed in a September 1, 2016 letter from S&ME to DEQ. S&ME contacted local drillers and researched community well data to evaluate the general hydrogeological conditions in the general area of the Site. The results indicated that depth to unweathered bedrock is typically 150 ft to 200 ft below land surface. Further, the conservative depth before encountering a water bearing fracture is 32 ft below the top of competent bedrock. Site well MW-7C, the deepest well at the Site, was drilled to 145 ft and competent rock was not encountered. S&ME conservatively estimated that competent bedrock would be encountered within 25 ft below MW-7C based on the observed rock cuttings (non-stained or oxidized "weathered" rock chips). Therefore, the contaminant plume would not be expected to extend vertically deeper than the top of competent bedrock. Additionally, the concentrations of detected VOCs indicate that vertical migration is not contaminant density driven, and instead is transported by advective flow with groundwater.

Based upon the vertical hydraulic gradient data, decreasing concentrations with depth and area geology/hydrogeology, lack of downgradient receptors (Section 2.2) additional assessment of the vertical extent of the groundwater contamination plume is not warranted.

2.2 Potential Receptors

A Declaration of Perpetual Land Use Restrictions is currently being prepared for the Site. These restrictions seek to limit on-Site exposure to potentially contaminated soil and groundwater. These restrictions will include limiting future site use to commercial or industrial purposes, prohibiting the use of Site groundwater for any purposes, and preventing disturbance of Site soil without prior approval from NCDEQ HWS.

In October 2013, S&ME conducted a receptor survey at the Site. Five properties with water supply wells were identified within a 0.5 mile radius of the Site. However, all five of these properties are located hydraulically upgradient of the Site, and therefore Site constituents are not expected to impact any water supply wells. The property immediately downgradient of the Site is undeveloped forest that extends for approximately 1,200 feet beyond the Site property line. The owner of this parcel has indicated that additional monitoring wells will not be allowed on the property. Beyond the adjacent parcel is a second property that is also undeveloped forest that extends for approximately 2,400 feet. No water supply wells are on these downgradient parcels; therefore, there is no exposure risk to potentially impacted groundwater.

There are two unnamed intermittent streams located on or directly downgradient of the Site. The two streams converge just off-Site and ultimately drain into Crowder's Creek approximately 1,000 feet from the Site boundary. Surface water samples have been collected from four sampling points (SW-1 through SW-4) on a near-annual basis since 2009. Surface water analytical results are shown in Table 4. No compound has ever been detected above its respective NCAC 2B Surface Water Quality Standard (2B Standard) for Class C streams. Chloroform, 1,1-DCA, 1,1-DCE, 1,2-dichloropropane, cis-1,2-DCE, and TCE are the only compounds that have been detected above laboratory reporting limits. In general, concentrations of these compounds have declined over time since 2009.

Based on the lack of water supply wells downgradient of the source property, the presence of undeveloped forest for at least 3,600 feet, and the lack of impacts above 2B Standards in the nearby stream, downgradient receptor risks are considered minimal at the Site.

2.3 Soil Impacts

Soil samples were collected at the Site in 1996 and 2016. Soil sample locations are shown on Figure 7 and soil analytical results are included in Table 5.

Five soil samples were collected from four soil borings in the vicinity of AOC 1 in 1996 and analyzed for VOCs. The analytical results indicated 1,1-DCA, 1,1-DCE, cis-1,2-DCE, 1,1,1-TCA, and TCE were detected in at least one sample above their respective NCDEQ Inactive Hazardous Sites Branch (IHSB) protection of groundwater (POG) preliminary soil remediation goals (PSRGs). In addition, one sample contained TCE above the residential PSRG and one sample contained TCE above the industrial PSRG.

S&ME conducted a confirmation soil sampling event in August 2016 to evaluate whether soil contamination was a continued concern in Site soil. Twelve samples were collected from eight soil borings for analysis of VOCs. Four of the borings attempted to sample near the 1996 soil boring locations. During the 2016 sampling event, only three samples contained VOC concentrations above PSRGs: 5 (25-27.5') contained 1,4-dioxane, 1,1,1-TCA, and TCE above POG PSRGs; SL-AC1-1 (10-15') contained 1,4-dioxane, TCE, and vinyl chloride above POG PSRGs; and H (27.5-30') contained 1,4-dioxane above residential PSRGs. No constituent exceeded industrial PSRGs. At soil borings that were resampled, contaminant concentrations declined dramatically from the 1996 sampling event. NCDEQ accepted that soil contamination is well defined and no additional delineation is required as stated in a letter dated June 17, 2016

In January 2016, twelve samples were collected from six soil borings for analysis of metals. Hexavalent chromium was detected above the POG PSRG in three samples. No other sample contained metals above PSRGs, and no metal exceeded Residential or Industrial PSRGs. The 2016 Facility Characterization Report recommended NFA for metals in soil in conjunction with perpetual land use restrictions (LURs). NCDEQ approved the NFA with LURs for soil metals in a letter dated June 17, 2016.

Soil contamination at the Site has been delineated in the horizontal and vertical directions. Based on the NFA for metals and reduced concentrations of VOCs over time, soil concentrations do not appear to be of major concern at the Site.

2.4 Indoor Air Impacts

In January 2016, S&ME collected three indoor air samples (IA-VI-1 through IA-VI-3) and one outdoor ambient air (background) sample (IA-VI-BG). The sample locations are shown on Figure 7, and the analytical results are given in Table 6. TCE was the only constituent detected above industrial indoor air screening levels (IASLs). TCE was detected at concentrations of 2.2 micrograms per cubic meter ($\mu g/m^3$) in IA-VI-1 and 1.9 $\mu g/m^3$ in IA-VI-2. Both samples are slightly above the industrial IASL of 1.75 $\mu g/m^3$. As documented in the 2016 Facility Characterization Report, NCDEQ conducted a risk evaluation based on the commercial exposure scenario. The results of the risk evaluation indicated that the concentrations did not exceed the cumulative carcinogenic risk of 10^{-5} or the hazard quotient of 1. Therefore, the report recommended NFA for indoor air. NCDEQ approved the NFA in a letter dated June 17, 2016.

2.5 Groundwater Impacts

2.5.1 Chlorinated VOCs

Historical groundwater VOC data is provided in Table 7. Figures 8 and 9 show total CVOCs in shallow and deep groundwater, respectively, during the most recent sampling event in November 2016. A geologic cross-section showing total CVOCs is provided as Figure 10. For the purposes of this report, total CVOCs is the sum of tetrachloroethene (PCE), TCE, cis-1,2-DCE, 1,1-DCE, trans-1,2-dichloroethene (trans-1,2-DCE), vinyl chloride (VC), 1,1,1-TCA, 1,1,2-trichloroethane (1,1,2-TCA), 1,1-DCA, 1,2-dichloroethane (1,2-DCA), and chloroethane.

TCE, cis-1,2-DCE, 1,1,1-TCA, and 1,1-DCE are generally present at the highest concentrations and account for 97% to 100% of total CVOCs detected at each well. Under the biotic reductive dechlorination pathway (Section 3.1.1), TCE is transformed to cis-1,2-DCE and/or 1,1-DCE. Under abiotic reduction, 1,1,1-TCA can also be transformed to 1,1-DCE. Since cis-1,2-DCE and 1,1-DCE

were not known to be used in Site processes, the presence of these compounds is likely due to the *in situ* destruction of TCE and 1,1,1-TCA. Graphs showing concentrations of TCE, cis-1,2-DCE, 1,1,1-TCA, 1,1-DCE, and total CVOCs at select monitoring wells are provided in Appendix B.

Total CVOC concentrations are highest in monitoring well MW-8, which is located near the suspected TCE spill area and screened in the shallow aquifer zone. During the November 2016 sampling event, total CVOCs were detected in MW-8 at a concentration of over 107,000 micrograms per liter (µg/L). This well also contained elevated concentrations of cis-1,2-DCE (60,000 µg/L), TCE (22,000 µg/L), and 1,1-DCE (21,000 µg/L), with slightly less elevated concentrations of 1,1,1-TCA (1,700 µg/L). Concentrations of total CVOCs as well as individual constituents have fluctuated over time but remained fairly stable.

Total CVOC concentrations were an order of magnitude lower in monitoring well MW-1, which is located approximately 45 feet downgradient of MW-8 and screened in the shallow aquifer zone. During the November 2016 sampling event, total CVOCs were detected in MW-1 at a concentration of 18,270 µg/L. 1,1-DCE (16,000 µg/L) was the primary contaminant located in this well, with lower concentrations of 1,1,1-TCA (1,300 µg/L), TCE (260 µg/L), and cis-1,2-DCE (220 µg/L). Concentrations of total CVOCs and individual constituents have fluctuated over time but remained relatively stable.

MW-6 is located approximately 100 feet downgradient of MW-8 and is screened in the intermediate aquifer zone. Concentrations of total CVOCs in MW-6 are approximately two orders of magnitude lower than those in MW-8. In November 2016, total CVOCs were detected in MW-6 at concentrations of 2,756 µg/L, essentially all of which was 1,1-DCE (2,700 µg/L). 1,1-DCE concentrations were increasing from 2009 to 2015. However, since May 2015 1,1-DCE concentrations have been decreasing.

Monitoring well cluster MW-5/7A/7B/7C is located approximately 240 feet downgradient of MW-8. Shallow monitoring well MW-5 has generally not contained VOCs above 2L Standards. In November 2016, total CVOCs were detected at elevated concentrations in intermediate monitoring wells MW-7A (5,728 µg/L) and MW-7B (1,063 µg/L) and bedrock monitoring well MW-7C (3,597

µg/L). Total CVOCs are generally a mix of TCE, cis-1,2-DCE, and 1,1-DCE in these wells and have been slowly increasing over time.

Monitoring well cluster MW-9/9A is located approximately 300 feet downgradient of MW-8 on the other side of the northern portion of the unnamed stream. In November 2016, total CVOCs were detected in intermediate monitoring well MW-9 at a concentration of 248 µg/L; only TCE and cis-1,2-DCE were detected above 2L Standards. Concentrations in this well increased substantially from 2009 to 2015, but have been generally declining since May 2015. In November 2016, total CVOCs were detected in bedrock monitoring well MW-9A at a concentration of 67 µg/L; only TCE was detected above 2L Standards. Concentrations in this well have declined since 2009.

CVOCs, primarily TCE, cis-1,2-DCE, 1,1,1-TCA, and 1,1-DCE, are a significant groundwater concern at the Site. CVOCs are detected primarily along a transect from MW-8 to MW-9/9A and concentrations generally decrease with increasing distance from the source area. Total CVOC concentrations are highest in monitoring well MW-8, with an order of magnitude decrease in the closest monitoring well (MW-1), located approximately 55 feet downgradient. Concentrations decline by another order of magnitude in the next closest monitoring well (MW-6). Concentrations of CVOCs are relatively stable in source area wells, but appear to be increasing in many downgradient wells.

Access to the adjacent downgradient property to install additional monitoring wells was denied by the property owner. To determine the likely distance where TCE will no longer be above its 2L Standard, data from MW-8, MW-1, MW-6, MW-7C, and MW-9 was fit to an exponential decay function (Appendix B). Based on concentrations from November 2016, TCE is expected to only exceed 2L Standards for approximately 250 feet beyond MW-9.

2.5.2 1,4-Dioxane

Historical groundwater 1,4-dioxane concentration data is provided in Table 7. 1,4-dioxane has only been analyzed since May 2016. Figures 11 and 12 show 1,4-dioxane in shallow and deep

groundwater, respectively, during the most recent sampling event in November 2016. A geologic cross-section showing 1,4-dioxane is provided as Figure 13.

1,4-dioxane is a synthetic industrial chemical that was used as a stabilizer for chlorinated solvents and is frequently measured in groundwater impacted by releases of 1,1,1-TCA. It is highly misicible in water and is persistent in the environment. Due to its miscibility and weak sorption potential, 1,4-dioxane typically migrates rapidly, typically at the same rate as groundwater; therefore, it is generally found at the leading edge of a groundwater plume. At the Site, the highest concentration is found in shallow source area well MW-8 at 3,300 µg/L. Wells near the source area and generally downgradient (MW-1 and MW-6) do not have detectable concentrations of 1,4-dioxane. However, monitoring well MW-9, located approximately 300 feet downgradient of MW-8, contained 1,4-dioxane at 320 µg/L. Seven additional monitoring wells (MW-7A, MW-7B, MW-7C, MW-9A, MW-10, MW-10A, and MW-11) contained 1,4-dioxane above the 2L Standard of 3 µg/L, with concentrations in these wells ranging from 3.1 to 63 µg/L. At monitoring well clusters with shallow and deep wells, 1,4-dioxane concentrations generally decrease with depth.

The lateral and vertical distribution of 1,4-dioxane at the Site suggests that preferential flow paths exist (Figures 12 and 13), which is not uncommon in Piedmont geology. Based upon current data, 1,4-dioxane is being transported primarily in an easterly direction, with some flow to the east-southeast closer to the downgradient unnamed stream. 1,4-dioxane is present in greatest concentrations at intermediate depths, except in the source area.

Although 1,4-dioxane is a concern at the Site it is not considered the primary driver of corrective action because it is generally 20 to 100 times lower than total CVOC concentrations. Therefore, corrective actions taken at the site will not focus on 1,4-dioxane at this time. However, in the event that site conditions change and/or technologies for remediating 1,4-dioxane become more efficient and cost effective, the corrective action may be amended to address 1,4-dioxane.

2.5.3 Chromium

Historical groundwater chromium data is provided in Table 8. Chromium has consistently been detected at concentrations above the 2L Standard of 0.01 milligrams per liter (mg/L) in monitoring wells MW-4 and MW-11. During the most recent sampling event in November 2016, only MW-4 contained chromium above the 2L Standard, at a concentration of 0.12 mg/L. Chromium was detected at concentrations below the 2L Standard in MW-11 during the May 2016 and November 2016 sampling events.

In order to evaluate trends in the groundwater chromium concentrations, a Mann-Kendall analysis was conducted on monitoring wells MW-4 and MW-11. Mann-Kendall is a non-parametric statistical analysis used to evaluate trends over time. The trends are identified as decreasing, probably decreasing, stable, no trend, probably increasing, or increasing. H&H utilized an Excel-based Mann-Kendall tool developed by GSI Environmental, Inc. The results of the Mann-Kendall analysis are included in Appendix C. The trends in both monitoring wells were identified as decreasing.

Chromium does not appear to be a major concern at the Site, and as such will not be addressed in this CM Work Plan. In addition, H&H recommends discontinuing monitoring for chromium during future sampling events. Chromium concentrations have only been detected above the 2L Standard consistently in on-Site monitoring wells MW-4 and MW-11. Concentrations in both wells are decreasing over time, and chromium has not exceeded the 2L Standard in MW-11 during the two most recent sampling events. Chromium has not been detected in off-Site wells. Additionally, a Declaration of Perpetual Land Use Restrictions is currently being prepared for the Site that will prevent exposure to potentially contaminated soil and groundwater.

3.0 Corrective Measures

A previous Corrective Measures Work Plan was submitted by S&ME on November 9, 2016. That work plan recommended *in situ* chemical oxidation (ISCO) to treat the source area and monitored natural attenuation (MNA) to treat the downgradient portion of the groundwater plume. In a letter dated January 4, 2017, NCDEQ tentatively approved proposed corrective actions to actively treat groundwater impacts in the source area and rely on MNA to address the downgradient impacts. However, NCDEQ had numerous comments questioning the efficacy of the selected remedy. Upon review, H&H determined that enhanced reductive dechlorination (ERD) would be a more cost-effective source area remedy while still achieving significant contaminant reduction. The following sections describe ERD and MNA in detail and summarize the proposed remedy.

3.1 Corrective Measures Summary

3.1.1 Enhanced Reductive Dechlorination

Enhanced reductive dechlorination (ERD) is a widely accepted technology for *in situ* remediation of CVOCs. ERD involves the addition of an electron donor, typically in the form of a fermentable organic substrate, to stimulate the biological reduction of CVOCs, including chlorinated ethenes and ethanes. The added organic substrates are first fermented to hydrogen (H_2) and volatile fatty acids (VFAs), which then serve as an electron donor and carbon source for microbial growth. Under ERD, CVOCs are sequentially reduced through a series of two-electron transfer reactions where a chlorine atom is removed and replaced with a hydrogen atom. For example, TCE is reduced to dichloroethene (cis-1,2-DCE, trans-1,2-DCE, or 1,1-DCE), which is then reduced to VC, followed by non-toxic ethene.

Various naturally-occurring electron acceptors can potentially compete with the reductive dechlorination process, including dissolved oxygen (DO), nitrate, ferric iron [Fe(III)], sulfate, and carbon dioxide (methanogenesis). Each sequential reaction reduces the oxidation-reduction potential (ORP) of the groundwater into the range in which anaerobic reductive dechlorination can occur most efficiently. The reductive dechlorination process occurs most efficiently when

competing electron acceptors have been depleted and a CVOC such as TCE is utilized as the electron acceptor.

Reductive dechlorination occurs under anaerobic conditions. Aerobic bacteria will first utilize DO as the most energetically-favorable electron acceptor. When DO is depleted, anaerobic bacteria proliferate and begin using the next available electron acceptor (e.g. nitrate, sulfate, ferric iron, or carbon dioxide). Nitrate may be used as an electron acceptor for anaerobic biodegradation via denitrification. In this process, nitrate is reduced and nitrite is produced. Following depletion of nitrate, iron and sulfate reduction and methanogenesis are the next most energetically-favorable anaerobic processes. Fe(III) is reduced to ferrous iron [Fe(II)], which is very soluble. Sulfate is reduced to sulfide, which often forms insoluble complexes with metals (e.g., FeS). Reduction of sulfate is important as sulfate concentrations greater than 20 mg/L may inhibit reductive dechlorination. Methanogenesis is a form of anaerobic respiration by microbes known as methanogens that produces methane from substrates including carbon dioxide. The presence of methane above background conditions indicates methanogenesis is occurring and strongly reducing conditions have been established. Efficient anaerobic reductive dechlorination typically occurs under sulfate-reducing to methanogenic conditions.

The pH of groundwater affects the presence and activity of microbial populations. Groundwater pH ranging from 6 to 8 standard units (SU) is generally preferable for anaerobic biodegradation. Organic acid generated during reductive dechlorination can decrease pH levels over time. As such, pH adjustment may be required in areas with low pH and/or poor natural buffering capacity.

3.1.2 Monitored Natural Attenuation

CVOCs such as TCE, 1,1,1-TCA, and their degradation products may degrade over time through natural reductive dechlorination in many groundwater systems. As detailed in the following, the geochemistry of Site groundwater and the presence of daughter products indicate that reductive dechlorination is occurring to some extent at the Site. In addition to reductive dechlorination, other natural attenuation processes such as dilution, chemical transformation, adsorption, and dispersion are mechanisms which can reduce compound concentrations over time.

MNA is a remedial option in which groundwater samples are routinely collected from select monitoring wells for analysis of compounds present in Site groundwater and geochemical parameters. These data are used to evaluate compound concentrations over time and to evaluate whether natural processes such as reductive dechlorination continue to occur at the Site. Additionally, MNA data is used to understand plume migration over time to ensure that receptors, if present, will not be impacted and thereby protecting human health and the environment. A natural attenuation corrective action approach is appropriate where impacted soils are not continuing to be a source of groundwater impacts, chemicals of concern are biodegrading, and potential receptors are not affected.

3.2 Site Geochemistry

As described in Section 3.1.1, certain geochemical conditions are required to ensure efficient degradation of CVOCs. In order to determine if the Site is amenable to ERD and MNA of CVOCs, Site conditions were reviewed. Historical VOC analytical data is included in Table 7, and historical field parameter is included in Table 9. In August 2016, a geochemical sampling event was conducted by S&ME to evaluate the presence of competing electron acceptors. This data is also included in Table 9.

3.2.1 Dissolved Oxygen

Reductive dechlorination occurs under anaerobic conditions; therefore, measurement of DO concentrations is an important parameter in evaluating reductive dechlorination of chlorinated ethenes. DO concentrations close to or less than 1 mg/L are favorable for reductive dechlorination. DO concentrations are lowest in source area well MW-8 (0.32 mg/L), indicating reducing conditions are already occurring in this area of the Site. DO concentrations are slightly higher in downgradient monitoring wells (2.57 to 3.67 mg/L).

3.2.2 Nitrate

Nitrate may be used as an electron acceptor for anaerobic biodegradation. In general, nitrate concentrations in the plume less than background are considered indicative of anaerobic biodegradation. At concentrations greater than 1 mg/l, nitrate may compete with the reductive

dechlorination process. Nitrate concentrations at the Site range from 0.47 mg/L (MW-8) to 2.5 mg/L (MW-2). MW-2 is an unimpacted upgradient well. Nitrate does not appear to be a significant electron acceptor competing with the reductive dechlorination process at the Site.

3.2.3 Iron

Under iron reducing conditions, Fe(III) is reduced to Fe(II), which is relatively soluble. The presence of Fe(II) in groundwater greater than 1 mg/L is considered to be an indication of iron-reducing conditions. Iron was detected at concentrations ranging from 0.24 mg/L (MW-2) to 1.8 mg/L (MW-7A). Interestingly, iron was not detected above laboratory reporting limits in source area well MW-8. Based on the data, it appears that iron reduction is an active terminal receptor in portions of the plume, but does not appear to be widespread in the aquifer.

3.2.4 Sulfate

The process of sulfate reduction results in the depletion of sulfate and the production of sulfide. Sulfate concentrations within the plume that are below background concentrations indicate that anaerobic sulfate reduction may be occurring. Sulfate at concentrations greater than 20 mg/L may inhibit reductive dechlorination processes. Sulfate was detected in only one sample (MW-7C) at a concentration of 2.7 mg/L. Sulfate was not detected above the laboratory reporting level of 1 mg/L in three other wells. Therefore, sulfate is not expected to compete with the reductive dechlorination process at the Site.

3.2.5 Methane

Methanogenesis occurs under highly reducing conditions that are most favorable for the reductive dechlorination processes. The presence of methane above background conditions indicates methanogenesis is occurring and strongly reducing conditions have been established. The methane concentration in source area monitoring well MW-8 (13 µg/L) was higher than upgradient well MW-2 (4.1 µg/L). Other monitoring wells contained methane below background levels. Thus, slight methanogenic conditions have developed in the source area but are not present in most of the Site.

3.2.6 pH

Groundwater pH ranging from 6 to 8 SU is generally preferable for anaerobic biodegradation. In November 2016, groundwater pH ranged from 4.76 SU at MW-8 to 7.97 SU at MW-10A during the baseline monitoring event. The lowest pH values are generally found near the source area (i.e., MW-8 and MW-1). Therefore, pH adjustment during substrate addition may be required to ensure efficient reductive dechlorination.

3.2.7 Daughter Products

The presence of daughter products can be strong indicators that reductive dechlorination is occurring at the Site. Under reductive dechlorination, TCE can be transformed into dichloroethene (cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCE) and vinyl chloride, while 1,1,1-TCA can be transformed into 1,1-DCA. Under abiotic reduction, 1,1,1-TCA can also be reduced to 1,1-DCE. The daughter products cis-1,2-DCE and 1,1-DCE are present throughout the Site at elevated concentrations. In fact, at most wells the concentration of one or both daughter products exceed the concentrations of parent compounds. 1,2-DCA is also found at elevated concentrations in source area well MW-8. The presence of these daughter products indicate that dechlorination of the parent compounds is already occurring at the Site.

3.3 Remedial Design

The following sections provide details on the remedial design and remedy implementation.

3.3.1 Injection Well Locations and Construction

Three injection wells are proposed for treating the main source area. The locations of the proposed injection wells are shown in Figures 14 and 15. The locations and depths of the injection wells were selected to treat the zone with the highest concentrations of CVOCs. The proposed injection wells will be drilled using air rotary techniques to total depths of approximately 80 ft bls. The wells will be screened from 80 ft bls to the top of groundwater, approximately 40 ft bls. Each well will be

constructed using four-inch diameter galvanized steel 10 slot screen connected to Schedule 40 poly-vinyl chloride (PVC) riser. Filter sand will be placed in the annular space around the screen to approximately one-foot above the screen. The seal will consist of a minimum of three feet of bentonite. After allowing the bentonite to hydrate, the remaining annular space will be filled with grout to approximately six inches from grade. Injection wells will be finished with lockable flush-mounted well steel vaults at land surface.

Following installation, each well will be developed to remove fines from the filter pack by pumping. Development water and solids generated during the drilling activities will be containerized and staged at the Site for subsequent characterization and disposal. Well installation and development activities are expected to be completed in 4 days.

3.3.2 Injection Calculations

There are many organic substrates that are capable of being naturally fermented in the subsurface to H_2, which serves as the ultimate electron donor in ERD. Organic carbon sources most commonly used for ERD include soluble substrates (e.g., molasses or lactate) and slow-release substrates (e.g., hydrogen release compounds or emulsified vegetable oils [EVOs]). Soluble substrates can be readily injected and distributed throughout the aquifer matrix, but are quickly consumed and require continuous or periodic injection. Slow-release substrates are less mobile in the subsurface, but are intended to be long-lasting, requiring a single or limited number of injections to last for years. Based on the high concentrations of CVOCs at the Site, EVO was selected for the corrective measures implementation.

The anticipated volume of solution injected in each injection well can be calculated as the volume of a cylinder:

$$V = \pi * r^2 * h * n * 7.48$$

where

V = volume of injected solution (gal)

r = radius of influence (ft)

h = height of well screen (ft)

n = effective porosity (assumed to be 0.3)

7.48 = conversion factor of ft^3 to gallons

It is anticipated that the radius of influence (ROI) of the injection wells will be approximately 10 ft. Based on a theoretical ROI of 10 ft and a 40 ft well screen, it is estimated that each injection well will require approximately 28,200 gallons of solution. Parsons Infrastructure & Technology Group, Inc. (Parsons) developed a design tool for the US Department of Defense Environmental Security Technology Certification Program (ESTCP) to estimate the amount of injectant required based on background geochemistry and a number of design factors. The resulting calculations are given in Appendix D. Based on the design tool calculations, it is estimated that 933 gallons (7,280 pounds) of EVO will be required per injection well. Thus, the EVO will be injected as an approximate 3% solution. Total injection volumes will be determined based on field conditions assessed following injection well installation.

3.3.3 Injection Process

Following installation and development of the injection wells, the injection solution will be injected into the subsurface. A manifold system with hoses, valves, and pipe fittings will be used to inject the wells simultaneously. Each well will have a pressure gauge, a flow meter, and a valve to regulate the pressure and flow rate. The injectant will be injected through pipe extensions set within the screened interval. In addition, well packers will be inserted at specified depths within the injection wells to target a specific depth interval for the substrate injection. A well packer acts as a water-tight seal that can be placed inside a well to prevent injection fluids from surfacing. The specified depth intervals for the well packers will be field determined based on lithology, contaminant concentration data, and other sub-surface conditions.

During the injection process, flow rates and volumes will be measured with totalizing flow meters. Pressures will be measured with pressure gauges. Injection pressures and flow rates will be

determined in the field to minimize pressure applied. Injection pressures will be limited to approximately 10 to 15 pounds per square inch (psi) above existing hydrostatic water pressures, if possible, to prevent hydrofracturing the subsurface. Increases in potentiometric head around the injection well will be monitored by measuring the depth to water in injection wells and/or nearby monitoring wells periodically during the injection and comparing the readings with pre-injection measurements. Necessary adjustments to pressure and flow rates will be made to minimize undesirable increases in potentiometric head.

Following substrate injection at each well, anaerobic chase water will be injected at a volume equal to approximately five times the well volume. The chase water clears the well and pushes the substrate into the formation; the chase water also limits the potential for biofouling of the injection well.

Due to the low pH and low alkalinity in the source area, sodium bicarbonate will be added to the injection solution as a pH buffer to keep subsurface pH above 6 SU. Sodium bicarbonate will be mixed with the injection solution to create a buffer concentration of approximately 8 grams per liter. The organic substrate, dilution water, and sodium bicarbonate will be mixed within a holding tank on-Site. The injection activities are expected to be completed in 8-10 field days.

3.3.4 Permits

Prior to installation of the injection wells, an underground injection control (UIC) permit will be obtained from NCDEQ.

3.4 Schedule of Implementation

Once approval of this CM Work Plan is granted by NCDEQ, H&H will begin working on the UIC permit for the injectant. It is anticipated that approval of the UIC permit could take up to 3 months. It is anticipated that installation of the injection wells will occur within 30 to 45 days following approval of the UIC permit. The baseline monitoring event (Section 4.1) will be conducted 1-2 weeks following installation and development of the injection wells. After receipt of the data from the baseline monitoring event, the data will be analyzed to optimize the injection strategy.

Approximately one month after performing the baseline monitoring event, the injection event will be conducted. Therefore, it is anticipated that injections at the Site will be conducted approximately 6 months following approval of this CM Work Plan.

4.0 Monitoring and Reporting

To verify the remedy is protective of human health and the environment, groundwater concentrations will be monitored over time. Table 10 presents a summary of the proposed groundwater performance monitoring plan. A sampling event will occur immediately prior to substrate injection to establish baseline conditions at the Site. Following injection, performance monitoring events will occur to evaluate treatment progress at the Site. Two years after substrate injection, a review of Site data will be completed to determine treatment efficacy, longevity, and whether additional injections are required. The proposed monitoring and reporting program is described in greater detail in the following sections.

4.1 Baseline Monitoring

In accordance with 15A NCAC 13C .0306(o) and to establish baseline conditions, groundwater samples will be collected from the following wells prior to injection activities: MW-1, MW-2, MW-4, MW-5, MW-6, MW-7A, MW-7B, MW-7C, MW-8, MW-9, MW-9A, MW-10, MW-10A, MW-11, MW-11A, IW-1, IW-2, and IW-3. Prior to collecting samples for laboratory analysis, the monitoring wells will be purged using low flow techniques until pH, temperature, and specific conductivity stabilize. Groundwater samples will be collected from each well and field measured for DO, ORP, pH, specific conductivity, and temperature and submitted for laboratory analysis of VOCs, including 1,4-dioxane, by EPA Method 8260B. Groundwater samples will also be collected from select monitoring wells (MW-1, MW-6, MW-7A, MW-8, MW-9, IW-1, IW-2, and IW-3) for laboratory analysis of sulfate by EPA Method 300.0, dissolved gases (methane, ethane, and ethene) by EPA Method RSK 175, and total organic carbon (TOC) by EPA Method 5310B and field measurement of dissolved iron. The baseline monitoring event will also include the collection of four surface water samples (SW-1 through SW-4) for laboratory analysis of VOCs by EPA Method 8260B. Data from the baseline monitoring event will be summarized in the first performance monitoring report.

4.2 Performance Monitoring

Following injection activities, performance monitoring will be conducted to assess the efficacy of the selected remedy. Performance monitoring events will be conducted 3 months, 6 months, 12 months, 18 months, and 24 months following substrate injection. After two years, the monitoring program will transition to biennial sampling. In addition, a review of Site data will be completed after two years to determine treatment efficacy, longevity, and if additional injections are required.

Samples from MW-1, MW-6, MW-7A, MW-8, and MW-9 will be collected during each performance monitoring event. Samples from MW-2, MW-4, MW-5, MW7B, MW-7C, MW-9A, MW-10, MW-10A, MW-11, and MW-11A will be analyzed during the semi-annual monitoring events. Samples from injection wells IW-1 through IW-3 will be analyzed during the annual monitoring events. During the performance monitoring events, samples will be collected for the same field parameters and laboratory analyses described in the baseline sampling section.

Surface water samples SW-1 through SW-4 will be collected and analyzed during the 12 month and 24 month monitoring events. Concentrations of VOCs have previously been detected in surface water samples; however, they have consistently been below 2B Surface Water Standards. If surface water concentrations remain below 2B Standards, surface water sampling will be discontinued following the 24 month performance monitoring event.

4.3 Reporting

During the first year after injection, groundwater monitoring reports will be submitted to NCDEQ on a semi-annual basis. After one year, groundwater reporting will transition to an annual basis. Data from the baseline, 3 month, and 6 month monitoring events will be included in the first semi-annual monitoring report. Data from the 12 month performance monitoring event will be included in the second semi-annual groundwater monitoring report, and data from the 18 and 24 month performance monitoring events will be included in the first biennial groundwater monitoring report. Groundwater analytical data that is collected between monitoring reports (i.e., data from the 3 month and 18 month performance monitoring events) will be submitted to NCDEQ via email.

Groundwater monitoring reports will include a review of the water level measurements, laboratory analytical data, field measurements, summary data tables, and figures depicting groundwater potentiometric maps, plume concentrations and locations, and other information as appropriate. Copies of the laboratory analytical report and chain of custody documentation will also be included in the monitoring reports. The first biennial monitoring report will also include a review of Site data to determine treatment efficacy, longevity, and whether additional injections are required.

5.0 Cost Estimate

A cost estimate for the proposed corrective measures implementation is included in Table 11. This cost estimate includes installation of injection wells, baseline monitoring, performing one injection event, performance monitoring and reporting for 2 years, and biennial groundwater monitoring and reporting for up to 30 years. The total costs estimated to carry the project through the anticipated 30 year clean-up timeframe is approximately $531,000.

Tables

Table 1
Site AOCs and SWMUs
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

AOC/SWMU Number	AOC/SWMU Description
AOC 1	TCE Surface Release Area
AOC 2	Sandblasting Unit Ventilation System
AOC 3	Former Metal Plating Building Ventilation System
SWMU 1	Former Metal Plating Building (Hazardous Waste Storage Area)
SWMU 2	Former Holding Tank
SWMU 3	Used Oil Mobile Wet-Vac
SWMU 4	1,000-Gallon Used Oil Storage Drum
SWMU 5	Waste Oil Storage Drum
SWMU 6	Plasma Cutter Flow-Down Baghouse
SWMU 7	Sandblasting Unit
SWMU 8	Non-Hazardous Satellite Waste Storage Recepticles (various locations)
SWMU 9	Municipal Dumpsters
SWMU 10	Satellite Scrap Metal Accumulation Areas (various locations)
SWMU 11	Scrap Metal Sorting Area

Notes:

AOC	Area of Concern
SWMU	Solid Waste Management Unit

Table 2
Monitoring Well Construction Details and Groundwater Elevation Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

					5/26/2015		10/29/2015		5/10/2016		11/28/2016	
Well ID	Installation Date	Total Depth (ft bls)	Screen Interval (ft bls)	TOC Elevation (ft)	Depth to Water (ft bTOC)	Groundwater Elevation (ft)	Depth to Water (ft bTOC)	Groundwater Elevation (ft)	Depth to Water (ft bTOC)	Groundwater Elevation (ft)	Depth to Water (ft bTOC)	Groundwater Elevation (ft)
MW-1	3/23/1992	58.95	48.9 - 58.9	739.13	40.07	699.06	41.81	697.32	39.62	699.51	42.57	696.56
MW-2	12/1/1992	38.55	28.5 - 38.5	743.21	28.63	714.58	29.55	713.66	26.84	716.37	29.12	714.09
MW-3	11/30/1992	39.05	29 - 39	740.05	31.19	708.86	32.52	707.53	30.12	709.93	32.16	707.89
MW-4	2/1/1993	24.25	9.2 - 24.2	723.40	15.79	707.61	4.55	718.85	7.11	716.29	10.95	712.45
MW-5	2/2/1993	35.05	25 - 35	721.86	28.96	692.9	30.61	691.25	28.67	693.19	31.19	690.67
MW-6	Aug-93	92.81	82.8 - 92.8	738.11	42.54	695.57	44.1	694.01	42.21	695.9	45	693.11
MW-7A	Feb-95	75.61	65.6 - 75.6	721.88	29.37	692.51	30.75	691.13	29.09	692.79	31.33	690.55
MW-7B	Feb-95	116.64	106.6 - 116.6	722.35	30.04	692.31	31.78	690.57	29.74	692.61	31.83	690.52
MW-7C	1/13/2016	145	127 - 132	NA	NI	NA	NI	NA	30	NA	32.14	NA
MW-8	5/20/1996	49.75	39.7 - 49.7	737.95	39.31	698.64	41.05	696.9	38.8	699.15	41.16	696.79
MW-9	6/22/2007	100.05	90 - 100	712.42	20.03	692.39	21.4	691.02	19.63	692.79	21.78	690.64
MW-9A	6/22/2007	142.05	132 - 142	711.98	20.3	691.68	21.65	690.33	19.89	692.09	22.06	689.92
MW-10	6/26/2007	105.05	95 - 105	707.98	18.6	689.38	18.67	689.31	18.33	689.65	20.83	687.15
MW-10A	6/26/2007	160.05	150 - 160	708.09	18.6	689.49	19.3	688.79	20.47	687.62	20.58	687.51
MW-11	6/28/2007	106.05	101 - 106	723.00	30.64	692.36	30.94	692.06	30.32	692.68	31.94	691.06
MW-11A	6/28/2007	150.05	140 - 150	723.09	30.52	692.57	30.8	692.29	30.25	692.84	31.29	691.8
PZ-1A/S	NA	27.89	NA	725.99	NM	NA	28	697.99	NA	NA	NA	NA
PZ-1B/D	NA	54	NA	725.99	NM	NA	54.78	671.21	NA	NA	NA	NA
PZ-1AR	NA	32.94	NA	725.58	NM	NA	33.2	692.38	NA	NA	NA	NA
PZ-2A/S	NA	33.67	NA	733.04	NM	NA	Dry	NA	NA	NA	NA	NA
PZ-2B/D	NA	57.9	NA	733.04	NM	NA	36.3	696.74	NA	NA	NA	NA
PZ-2AR	NA	44.09	NA	732.79	NM	NA	36.25	696.54	NA	NA	NA	NA
PZ-3A/S	NA	42.82	NA	739.73	NM	NA	NM	NA	NM	NA	NM	NA
PZ-3B/D	NA	66.33	NA	739.73	NM	NA	NM	NA	NM	NA	NM	NA

Notes:

ft bls	Feet below land surface
TOC	Top of casing
bTOC	Below top of casing
NA	Not available
NI	Not installed
NM	Not measured

Table 3
Vertical Hydraulic Gradients
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Well ID	Screen Interval (ft bTOC)		TOC Elevation (ft)	5/26/2015			10/29/2015			5/10/2016			11/28/2016		
				Depth to Water (ft bTOC)	Vertical Gradient (ft/ft)	Direction	Depth to Water (ft bTOC)	Vertical Gradient (ft/ft)	Direction	Depth to Water (ft bTOC)	Vertical Gradient (ft/ft)	Direction	Depth to Water (ft bTOC)	Vertical Gradient (ft/ft)	Direction
MW-5	25.7	35.7	721.86	692.9			691.25			693.19			690.67		
MW-7A	63.2	73.2	721.88	692.51	0.010	Down	691.13	0.003	Down	692.79	0.011	Down	690.55	0.003	Down
MW-7B	104.5	114.5	722.35	692.31	0.005	Down	690.57	0.014	Down	692.61	0.004	Down	690.52	0.001	Down
MW-9	92.9	102.9	712.42	692.39			691.02			692.79			690.64		
MW-9A	134.9	144.9	711.98	691.68	0.017	Down	690.33	0.016	Down	692.09	0.016	Down	689.92	0.017	Down
MW-10	107.9	117.9	707.98	689.38			689.31			689.65			687.15		
MW-10A	153	163	708.09	689.49	0.002	Up	688.79	0.012	Down	687.62	0.045	Down	687.51	0.008	Up
MW-11	98.2	108.2	723.00	692.36			692.06			692.68			691.06		
MW-11A	142	152	723.09	692.57	0.005	Up	692.29	0.005	Up	692.84	0.004	Up	691.8	0.017	Up

Notes:
ft Feet
bTOC Below top of casing

Table 4
Historical Surface Water Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

		Volatile Organic Compounds (EPA 8260B)					
Sample ID	Sample Date	Chloroform	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloropropane	cis-1,2-Dichloroethene	Trichloroethene
2B Standards		**170**	**6**	**330**	**15**	**60**	**30**
SW-1	01/23/09	<1.0	<1.0	1.3	<1.0	<1.0	23.6
	05/22/12	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	04/30/13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	04/30/14	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	05/10/16	<0.50	<0.50	3.3	<0.50	2.2	2.9
SW-2	01/23/09	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	05/22/12	<1.0	<1.0	<1.0	3.4	<1.0	<1.0
	04/30/13	<1.0	<1.0	<1.0	1.1	<1.0	<1.0
	04/30/14	0.39 J	<1.0	<1.0	2.9	<1.0	<1.0
	05/10/16	<0.50	<0.50	2.0	3.1	0.54	1.0
SW-3	01/23/09	1.5	1.5	11.6	<1.0	10.6	29.6
	05/22/12	<1.0	<1.0	<1.0	1.6	<1.0	<1.0
	04/30/13	<1.0	<1.0	<1.0	1.2	<1.0	<1.0
	04/30/14	0.28 J	<1.0	<1.0	2.1	<1.0	<1.0
	05/10/16	<0.50	<0.50	1.3	1.2	<0.50	<0.50
SW-4	01/23/09	<1.0	<1.0	<1.0	4.5	<1.0	<1.0
	05/22/12	<1.0	<1.0	<1.0	2.2	<1.0	<1.0
	04/30/13	<1.0	<1.0	<1.0	1.5	<1.0	<1.0
	04/30/14	0.39 J	<1.0	<1.0	2.4	<1.0	<1.0
	05/10/16	<0.50	<0.50	1.6	2.3	<0.50	0.64

Notes:

Analytical results compared to 15A NCAC 2B Surface Water Quality Standards for Class C streams
Only those compounds detected in at least one sample are shown above
All data is presented in micrograms per liter (µg/L)
Bold values indicate exceedance of 2B Standards
J Estimated concentration below laboratory reporting limit

Table 5
Historical Soil Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

			Volatile Organic Compounds (EPA 8260B)											Metals (EPA Methods 6010C, 7196A, and 7471B)						
Sample ID	Sample Depth (ft bls)	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,4-Dioxane	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride	Barium	Chromium (Total)	Trivalent Chromium	Hexavalent Chromium	Lead	Nickel	Mercury
Protection of Groundwater PSRG			**0.03**	**0.02**	**0.023**	**0.36**	**0.55**	**0.012**	**5.5**	**1.2**	**0.0032**	**0.018**	**0.00019**	**3,000**	**NS**	**24,000**	**0.3**	**400**	**300**	**1.9**
Residential PSRG			**3.6**	**0.46**	**46**	**32**	**320**	**5.3**	**818**	**640**	**0.3**	**0.82**	**0.059**	**44,000**	**NS**	**100,000**	**6.3**	**800**	**4,400**	**3.1**
Industrial PSRG			**16**	**2**	**200**	**460**	**1,850**	**24**	**818**	**640**	**1.26**	**3.8**	**1.7**	**580**	**NS**	**360,000**	**3.8**	**270**	**130**	**1.0**
5	8	03/27/96	<0.625	<0.625	NA	**6.7**	NA	NA	NA	**4.9**	NA	**31**	NR	NA	NA	NA	NA	NA	NA	NA
	12	03/27/96	<0.025	<0.025	NA	**2**	NA	NA	NA	0.34	NA	**1.8**	NR	NA	NA	NA	NA	NA	NA	NA
	25 - 27.5	08/16/16	0.014	0.0018 J	0.0075	0.36	0.0031	**1.2**	0.0010 J	0.0023	**0.0059**	**0.02**	<0.0096	NA	NA	NA	NA	NA	NA	NA
AS-2	30	05/22/96	0.0067	<0.005	**0.13**	0.088	NA	NA	<0.005	0.11	<0.005	**0.074**	NR	NA	NA	NA	NA	NA	NA	NA
	22.5 - 25	08/16/16	<0.0023	<0.0023	<0.0046	0.0053	<0.0023	<0.12	<0.0023	<0.0023	<0.0023	0.0013 J	<0.012	NA	NA	NA	NA	NA	NA	NA
H	8	05/13/96	**0.047**	NA	**0.062**	0.21	<0.005	NA	NA	0.027	NA	<0.005	NR	NA	NA	NA	NA	NA	NA	NA
	27.5 - 30	08/16/16	0.0046	0.0021	0.0012	0.1	<0.0019	**24**	<0.0019	<0.0019	0.0042	0.0042	<0.0094	NA	NA	NA	NA	NA	NA	NA
VP-1	30	05/22/96	<0.005	<0.005	<0.005	**1.8**	NA	NA	<0.005	<0.005	<0.005	**0.14**	NR	NA	NA	NA	NA	NA	NA	NA
	22.5 - 25	08/15/16	<0.0023	<0.0023	0.0013 J	0.023	<0.0023	<0.12	<0.0023	<0.0023	<0.0023	0.0021 J	<0.012	NA	NA	NA	NA	NA	NA	NA
SL-AC1-1	10 - 15	01/11/16	0.003	<0.0020	0.0092	0.1	<0.0020	**0.22**	<0.0020	<0.0020	<0.0020	**0.033**	**0.0022 J**	NA	19	19	<1.1	NA	NA	NA
	35 - 40	01/11/16	0.00081 J	<0.0022	0.0053	0.016	<0.0022	<0.11	<0.0022	<0.0022	<0.0022	0.011	<0.011	NA	7.2	7.2	<0.41	NA	NA	NA
SL-AC1-2	15 - 20	01/11/16	<0.0023	<0.0023	<0.0047	0.0025	<0.0023	<0.12	<0.0023	<0.0023	<0.0023	<0.0023	<0.012	NA	NA	NA	NA	NA	NA	NA
	35 - 38	01/11/16	<0.0023	<0.0023	0.0024 J	0.015	<0.0023	<0.12	<0.0023	<0.0023	<0.0023	0.0018 J	<0.012	NA	NA	NA	NA	NA	NA	NA
SL-AC1-3	19 - 20	01/07/16	0.0010 J	<0.0023	0.0022 J	0.035	<0.0023	<0.12	<0.0023	<0.0023	<0.0023	0.0044	<0.012	NA	NA	NA	NA	NA	NA	NA
	39 - 40	01/07/16	0.0012 J	<0.0019	0.0013 J	0.057	<0.0019	<0.097	<0.0019	<0.0019	<0.0019	0.0046	<0.0097	NA	NA	NA	NA	NA	NA	NA
	39 - 40 DUP	01/07/16	<0.0021	<0.0021	<0.0042	0.016	<0.0021	<0.11	<0.0021	<0.0021	<0.0021	0.0011 J	<0.011	NA	NA	NA	NA	NA	NA	NA
SL-AC1-4	19 - 20	01/07/16	<0.0020	<0.0020	<0.0040	<0.0020	<0.0020	<0.10	<0.0020	<0.0020	<0.0020	<0.0020	<0.010	NA	NA	NA	NA	NA	NA	NA
	34 - 35	01/07/16	<0.0022	<0.0022	<0.0043	<0.0022	<0.0022	<0.11	<0.0022	<0.0022	<0.0022	<0.0022	<0.011	NA	NA	NA	NA	NA	NA	NA
SL-AC2-1	0 - 0.5	01/11/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	34	33.29	**0.71**	NA	NA	NA
	0 - 0.5 DUP	01/11/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	35	34.04	**0.96**	NA	NA	NA
	4.5 - 5	01/11/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14	14	<1.0	NA	NA	NA
SL-AC2-2	0 - 1	01/07/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16	16	<1.1	NA	NA	NA
	9 - 10	01/07/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	17	17	<1.0	NA	NA	NA
SL-AC2-3	0 - 1	01/07/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13	12.36	**0.64 J**	NA	NA	NA
	9 - 10	01/07/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	26	26	<0.93	NA	NA	NA
SL-AC2-4	0 - 1	01/07/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	28	28	<0.40	NA	NA	NA
	9 - 10	01/07/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30	30	<0.37	NA	NA	NA
SL-SM1-1	0 - 1	01/12/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	130	25	25	<0.99	13	9.9	0.043
	0 - 1 DUP	01/12/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	110	23	23	<0.96	15	9.1	0.042
	9 - 10	01/12/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	70	18	18	<0.99	15	5.1	0.062
SL-SM1-2	0 - 1	01/12/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	120	17	17	<1.0	12	6.2	0.025 J
	9 - 10	01/12/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	80	27	24.3	**2.7**	14	6.3	0.075

Notes:
Only those compounds detected in at least one sample are shown above
All data is presented in milligrams per kilogram (mg/kg)
All values compared to Inactive Hazardous Sites Branch Preliminary Soil Remediation Goals (PSRGs)

VALUE	Value exceeds Protection of Groundwater PSRG
VALUE	Value exceeds Residential PSRG
VALUE	Value exceeds Industrial PSRG
ft bls	Feet below land surface
J	Estimated concentration below laboratory reporting limit
NA	Not analyzed
NR	Not reported
NS	No standard

Table 6
Indoor Air Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Sample ID	Sample Date	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	Tetrachloroethene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl Chloride
Industrial IASL		**7.67**	**0.472**	**175**	**35**	**4380**	**0.175**	**1.75**	**2.79**
IA-VI-1	01/27/16	0.36	0.12 J	11	0.78	4.8	<0.19	**2.2**	<0.090
IA-VI-1 (DUP)	01/27/16	0.33	0.11 J	11	0.44	4.6	<0.19	**2.1**	<0.090
IA-VI-2	01/27/16	0.76	<0.40	10	1.2	7.6	<0.55	**1.9**	<0.26
IV-VI-3	01/27/16	0.35 J	<0.40	15	3.3	4.2	<0.55	1.4	<0.26
IA-VI-BG	01/27/16	<0.14	<0.14	<0.14	<0.24	<0.19	<0.19	<0.19	<0.090

Notes:

Analytical results compared to NCDEQ DWM Indoor Air/Crawlspace Screening Levels (IASLs)

Only those compounds detected in at least one sample are shown above

All data is presented in micrograms per cubic meter ($\mu g/m^3$)

Bold values indicate exceedance of Industrial IASLs

J Estimated concentration below laboratory reporting limit

Table 7
Historical Groundwater VOC Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Well ID	Sample Date	Acetone	Benzene	Bromodichloromethane	2-Butanone (MEK)	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Diisopropyl ether	1,4-Dioxane	Ethylbenzene	p-Isopropyltoluene	Methylene Chloride	Methyl-tert-butyl ether	Naphthalene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride	Xylene (Total)	m&p-Xylene	o-Xylene
2L Standard		**6,000**	**1**	**0.6**	**4,000**	**3,000**	**70**	**3**	**6**	**0.4**	**350**	**70**	**100**	**0.6**	**70**	**3**	**600**	**25**	**5**	**20**	**6**	**0.7**	**600**	**200**	**0.6**	**3**	**0.03**	**500**	**500**	**500**
MW-1	01/21/09	<25.0	<1.0	<1.0	<5.0	<1.0	2.2	<1.0	**274**	<1.0	**12,200**	52.1	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	**1.3**	<1.0	**1,900**	<1.0	**84.8**	<1.0	NA	<2.0	<1.0
	08/27/09	<2,500	<100	<100	<500	<100	<100	<100	**257**	<100	**12,800**	<100	<100	<100	<100	NA	<100	<100	<200	<100	<100	<100	<100	**1,600**	<100	<100	<100	NA	<200	<100
	08/27/09 DUP	<2,500	<100	<100	<500	<100	<100	<100	**251**	<100	**12,500**	<100	<100	<100	<100	NA	<100	<100	<200	<100	<100	<100	<100	**1,630**	<100	<100	<100	NA	<200	<100
	05/06/10	<2,500	<100	<100	1010	<100	<100	<100	**232**	<100	**9,130**	<100	<100	<100	<100	NA	<100	<100	<200	<100	<100	<100	<100	**1,220**	<100	<100	<100	NA	<200	<100
	10/21/10	<1250	<50.0	<50.0	<250	<50.0	<50.0	<50.0	**265**	<50.0	**10,600**	**79.3**	<50.0	<50.0	<50.0	NA	<50.0	<50.0	<100	<50.0	<50.0	<50.0	<50.0	**1,420**	<50.0	**121**	<50.0	NA	<100	<50.0
	04/26/11	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**310**	<10.0	**12,900**	**99.4**	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	**1,310**	<10.0	**106**	<10.0	NA	<20.0	<10.0
	10/26/11	<2,500	<100	<100	<500	<100	<100	<100	**441**	<100	**14,600**	**145**	<100	<100	<100	NA	<100	<100	<200	<100	<100	<100	<100	**1,660**	<100	**131**	<100	NA	<200	<100
	05/22/12	<2,500	<100	<100	<500	<100	<100	<100	**394**	<100	**12,900**	**124**	<100	<100	<100	NA	<100	<100	<200	<100	<100	<100	<100	**1,380**	<100	**146**	<100	NA	<200	<100
	10/24/12	<2,500	<100	<100	<500	<100	<100	<100	**479**	<100	**16,900**	**149**	<100	<100	<100	NA	<100	<100	<200	<100	<100	<100	<100	**1,700**	<100	**157**	<100	<200	<200	<100
	04/30/13	<25.0	<1.0	<1.0	<5.0	1.3	1.8	<1.0	**441**	**2.4**	**13,800**	**157**	2	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	**1.5**	<1.0	**1,330**	<1.0	**171**	<1.0	<2.0	<2.0	<1.0
	10/30/13	<1250	**78.6**	<50.0	<250	<50.0	<50.0	<50.0	**441**	<50.0	**9,600**	**186**	<50.0	<50.0	<50.0	NA	<50.0	<50.0	<100	<50.0	<50.0	<50.0	52.5	**1,310**	<50.0	**192**	<50.0	<100	<100	<50.0
	04/28/14	<500	**34.2**	<9.0	<48.0	<27.0	<7.0	<5.5	**170**	<6.0	**5,160**	**94.9**	<24.5	<13.5	<6.0	NA	21.7	<15.5	**73**	<10.5	<10.5	<23.0	66.1	**485**	<14.5	**85.2**	<31.0	<33.0	56.2	25.9
	10/29/14	<500	<12.5	<9.0	<48.0	<27.0	<7.0	<5.5	**452**	<6.0	**14,100**	**182**	<24.5	<13.5	<6.0	NA	<15.0	<15.5	<48.5	<10.5	<10.5	<23.0	<13.0	**1,250**	<14.5	**219**	<31.0	<33.0	<33.0	<11.5
	05/26/15	18	0.68	<0.062	<0.24	<0.22	2.4	<0.079	**590**	**4.7**	**36,000**	**280**	9.5	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	**2.1**	0.77	**1,800**	<0.066	**320**	**0.89**	NA	<0.12	<0.044
	10/29/15	63	<0.048	<0.062	<0.24	<0.22	1.2	<0.079	**350**	**2.5**	**6,100**	**120**	1.7	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	**1.4**	<0.044	**800**	<0.066	**150**	<0.097	NA	<0.12	<0.044
	05/10/16	<500	<50	<50	<500	<50	<50	<50	**640**	<50	**17,000**	**290**	<50	<50	<50	<3.0	<50	<50	<100	<50	<100	<50	<50	**1,700**	<50	**360**	<50	NA	<100	<50
	11/30/16	<500	<50	<50	<500	<50	<50	<50	**490**	<50	**16,000**	**220**	<50	<50	<50	<3.0	<50	<50	<100	<50	<100	<50	<50	**1,300**	<50	**260**	<50	NA	<100	<50
MW-2	01/21/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	08/27/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/06/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/21/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/22/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/24/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	10/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/28/14	<10.0	<0.25	<0.18	<0.96	<0.54	<0.14	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	<0.47	<0.62	<0.66	<0.66	<0.23
	10/29/14	16.9	<0.25	<0.18	<0.96	<0.54	<0.14	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	<0.47	<0.62	<0.66	<0.66	<0.23
	05/26/15	17	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	<0.078	<0.097	NA	<0.12	<0.044
	10/29/15	48	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	<0.078	<0.097	NA	<0.12	<0.044
	05/10/16	20	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<1.0	<0.50
	11/30/16	<5.0	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<3.0	<0.50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<1.0	<0.50
	11/30/16 DUP	<5.0	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<3.0	<0.50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<1.0	<0.50

Table 7
Historical Groundwater VOC Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Well ID	Sample Date	Acetone	Benzene	Bromodichloromethane	2-Butanone (MEK)	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Diisopropyl ether	1,4-Dioxane	Ethylbenzene	p-Isopropyltoluene	Methylene Chloride	Methyl-tert-butyl ether	Naphthalene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride	Xylene (Total)	m&p-Xylene	o-Xylene
2L Standard		**6,000**	**1**	**0.6**	**4,000**	**3,000**	**70**	**3**	**6**	**0.4**	**350**	**70**	**100**	**0.6**	**70**	**3**	**600**	**25**	**5**	**20**	**6**	**0.7**	**600**	**200**	**0.6**	**3**	**0.03**	**500**	**500**	**500**
MW-4	01/22/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	08/27/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/06/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/21/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	04/26/11 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/26/11 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/22/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/24/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	10/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/28/14	<10.0	<0.25	<0.18	<0.96	<0.54	<0.14	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	<0.47	<0.62	<0.66	<0.66	<0.23
	10/29/14	93.7	<0.25	<0.18	<0.96	<0.54	<0.14	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	<0.47	<0.62	<0.66	<0.66	<0.23
	05/26/15	27	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	<0.078	<0.097	NA	<0.12	<0.044
	10/29/15	36	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	<0.11	<0.050	NA	<0.061	0.72	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	<0.078	<0.097	NA	<0.12	<0.044
	05/10/16	13	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<1.0	<0.50
	11/28/16	<5.0	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<1.0	<0.50
MW-5	11/28/16 DUP	<5.0	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<1.0	<0.50
	01/23/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	08/27/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	2.7	<1.0	44.4	62.9	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	2.3	<1.0	**61.1**	<1.0	NA	<2.0	<1.0
	05/06/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/21/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/22/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/24/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	10/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	NR	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/28/14	<10.0	<0.25	<0.18	<0.96	<0.54	<0.14	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	NR	<0.46	<0.26	<0.48	<0.29	<0.47	<0.62	<0.66	<0.66	<0.23
	10/29/14	104	<0.25	<0.18	<0.96	<0.54	<0.14	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	NR	<0.46	<0.26	<0.48	<0.29	<0.47	<0.62	<0.66	<0.66	<0.23
	05/26/15	<0.31	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	NR	<0.098	<0.044	<0.061	<0.066	<0.078	<0.097	NA	<0.12	<0.044
	10/29/15	54	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	0.54	<0.056	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	NR	<0.098	<0.044	<0.061	<0.066	<0.078	<0.097	NA	<0.12	<0.044
	05/10/16	14	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<1.0	<0.50
	11/28/16	<5.0	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	0.78	0.52	<0.50	<0.50	<0.50	<3.0	<0.50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<1.0	<0.50

Table 7
Historical Groundwater VOC Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Well ID	Sample Date	Acetone	Benzene	Bromodichloromethane	2-Butanone (MEK)	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Diisopropyl ether	1,4-Dioxane	Ethylbenzene	p-Isopropyltoluene	Methylene Chloride	Methyl-tert-butyl ether	Naphthalene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride	Xylene (Total)	m&p-Xylene	o-Xylene
2L Standard		**6,000**	**1**	**0.6**	**4,000**	**3,000**	**70**	**3**	**6**	**0.4**	**350**	**70**	**100**	**0.6**	**70**	**3**	**600**	**25**	**5**	**20**	**6**	**0.7**	**600**	**200**	**0.6**	**3**	**0.03**	**500**	**500**	**500**
MW-6	01/21/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**10.5**	<1.0	**467**	6.9	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	15	<1.0	**4**	<1.0	NA	<2.0	<1.0
	01/21/09 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**9.5**	<1.0	**484**	6.2	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	13.6	<1.0	**3.4**	<1.0	NA	<2.0	<1.0
	08/27/09	<125	<5.0	<5.0	<25.0	<5.0	<5.0	<5.0	**8.6**	<5.0	**665**	<5.0	<5.0	<5.0	<5.0	NA	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<10.0	<5.0
	05/06/10	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**11.5**	<10.0	**837**	<10.0	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	12.6	<10.0	<10.0	<10.0	NA	<20.0	<10.0
	05/06/10 DUP	<125	<5.0	<5.0	<25.0	<5.0	<5.0	<5.0	**9.5**	<5.0	**683**	<5.0	<5.0	<5.0	<5.0	NA	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	10.7	<5.0	<5.0	<5.0	NA	<10.0	<5.0
	10/21/10	<125	<5.0	<5.0	<25.0	<5.0	<5.0	<5.0	**13.9**	<5.0	**982**	5.1	<5.0	<5.0	<5.0	NA	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	19.1	<5.0	<5.0	<5.0	NA	<10.0	<5.0
	10/21/10 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	2.5	<1.0	168	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	3.3	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**15.4**	<1.0	**1,480**	4.4	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	20.4	<1.0	2.8	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**18.1**	<1.0	**1,350**	4.3	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	23	<1.0	2.6	<1.0	NA	<2.0	<1.0
	05/22/12	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**16.5**	<10.0	**1,180**	<10.0	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	16.1	<10.0	<10.0	<10.0	NA	<20.0	<10.0
	05/22/12 DUP	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**13.3**	<10.0	**1,100**	<10.0	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	12.8	<10.0	<10.0	<10.0	NA	<20.0	<10.0
	10/24/12	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**19.9**	<10.0	**1,640**	<10.0	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	17.4	<10.0	<10.0	<10.0	<20.0	<20.0	<10.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**20.3**	<1.0	**1,650**	4.6	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	19.9	<1.0	**4.1**	<1.0	<2.0	<2.0	<1.0
	04/30/13 DUP	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**16.3**	<10.0	**1,610**	<10.0	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	14.5	<10.0	<10.0	<10.0	<20.0	<20.0	<10.0
	10/30/13	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**15.5**	<10.0	**1,520**	<10.0	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<20.0	<20.0	<10.0
	04/28/14	<100	<2.5	<1.8	<9.6	<5.4	<1.4	<1.1	**18**	<1.2	**1,580**	4.4	<4.9	<2.7	<1.2	NA	<3.0	<3.1	**16.8**	<2.1	<2.1	<4.6	<2.6	15.4	<2.9	<4.7	<6.2	<6.6	<6.6	<2.3
	10/29/14	<125	<3.1	<2.2	<12.0	<6.8	<1.8	<1.4	**16.8**	<1.5	**1,520**	3.6	<6.1	<3.4	<1.5	NA	<3.8	<3.9	<12.1	<2.6	<2.6	<5.8	<3.2	11.2	<3.6	<5.9	<7.8	<8.2	<8.2	<2.9
	10/29/14 DUP	<100	<2.5	<1.8	<9.6	<5.4	<1.4	<1.1	**18.2**	<1.2	**1,600**	5.8	<4.9	<2.7	<1.2	NA	<3.0	<3.1	<9.7	<2.1	<2.1	<4.6	<2.6	11.7	<2.9	<4.7	<6.2	<6.6	<6.6	<2.3
	05/26/15	31	<0.048	<0.062	<0.24	<0.22	0.52	<0.079	**31**	<0.066	**3,000**	6.1	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	23	<0.066	**6.5**	<0.097	NA	<0.12	<0.044
	5/26/15 DUP	26	<0.048	<0.062	<0.24	<0.22	0.52	<0.079	**31**	<0.066	**3,000**	6.3	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	23	<0.066	**6.5**	<0.097	NA	<0.12	<0.044
	10/29/15	53	<0.48	<0.62	<2.4	<2.2	<0.76	<0.79	**24**	<0.66	**2,900**	5.5	<0.94	<1.1	<0.50	NA	<0.61	<0.89	<0.83	<0.42	<0.42	<0.98	<0.44	20	<0.66	**5.9**	<0.97	NA	<1.2	<0.44
	05/10/16	33 J	<5.0	<5.0	<50	<5.0	<5.0	<5.0	**28**	<5.0	**2,900**	5.5	<5.0	<5.0	<5.0	<3.0	<5.0	<5.0	<10	<5.0	<10	<5.0	<5.0	18	<5.0	**6.1**	<5.0	NA	<10	<5.0
	11/30/16	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0	**27**	<5.0	**2,700**	8.4	<5.0	<5.0	<5.0	<3.0	<5.0	<5.0	<10	<5.0	<10	<5.0	<5.0	15	<5.0	**6**	<5.0	NA	<10	<5.0
MW-7A	01/22/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**20.6**	<1.0	202	**493**	2.1	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	13.4	<1.0	**1,010**	<1.0	NA	<2.0	<1.0
	08/28/09	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**19.9**	<10.0	234	**545**	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	12.9	<10.0	**992**	<10.0	NA	<20.0	<10.0
	05/06/10	<125	<5.0	<5.0	<25.0	<5.0	<5.0	<5.0	**33.1**	<5.0	334	**834**	5.1	<5.0	<5.0	NA	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	17	<5.0	**899**	<5.0	NA	<10.0	<5.0
	10/21/10	<125	<5.0	<5.0	<25.0	<5.0	<5.0	<5.0	**42**	<5.0	**508**	**731**	<5.0	<5.0	<5.0	NA	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	29	<5.0	**1,060**	<5.0	NA	<10.0	<5.0
	04/26/11	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**32.4**	<10.0	**384**	**729**	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	17.9	<10.0	**929**	<10.0	NA	<20.0	<10.0
	10/26/11	<125	<5.0	<5.0	<25.0	<5.0	<5.0	<5.0	**34.9**	<5.0	**426**	**804**	<5.0	<5.0	<5.0	NA	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	18.4	<5.0	**883**	<5.0	NA	<10.0	<5.0
	05/22/12	<125	<5.0	<5.0	<25.0	<5.0	<5.0	<5.0	**32.1**	<5.0	**402**	**743**	<5.0	<5.0	<5.0	NA	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	15.9	<5.0	**789**	<5.0	NA	<10.0	<5.0
	10/24/12	<100	<4.0	<4.0	25.6	<4.0	<4.0	<4.0	**44.6**	<4.0	**603**	**1,050**	<4.0	<4.0	<4.0	NA	<4.0	<4.0	<8.0	<4.0	<4.0	<4.0	<4.0	22.1	<4.0	**933**	<4.0	<8.0	<8.0	<4.0
	04/30/13	<250	<10.0	<10.0	<50.0	<10.0	<10.0	<10.0	**34.2**	<10.0	**471**	**763**	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	16.7	<10.0	**928**	<10.0	<20.0	<20.0	<10.0
	10/30/13	<125	<5.0	<5.0	<25.0	<5.0	<5.0	<5.0	**41.1**	<5.0	**597**	**930**	<5.0	<5.0	<5.0	NA	<5.0	<5.0	<10.0	<5.0	<5.0	<5.0	<5.0	18.8	<5.0	**916**	<5.0	<10.0	<10.0	<5.0
	10/30/13 DUP	<250	**13.5**	<10.0	<50.0	<10.0	<10.0	<10.0	**44.3**	<10.0	**738**	**1,100**	<10.0	<10.0	<10.0	NA	<10.0	<10.0	<20.0	<10.0	<10.0	<10.0	<10.0	17	<10.0	**1,010**	<10.0	<20.0	<20.0	<10.0
	04/28/14	<100	<2.5	<1.8	<9.6	<5.4	<1.4	<1.1	**46.7**	<1.2	**698**	**1,120**	5.8	<2.7	<1.2	NA	<3.0	<3.1	**18.3**	<2.1	<2.1	<4.6	<2.6	22.5	<2.9	**987**	<6.2	<6.6	<6.6	<2.3
	04/28/14 DUP	<100	**6.7**	<1.8	<9.6	<5.4	<1.4	<1.1	**44.3**	<1.2	**647**	**1,060**	4.9	<2.7	<1.2	NA	4.5	<3.1	**18.1**	<2.1	<2.1	<4.6	13.3	20.9	<2.9	**923**	<6.2	<6.6	15.7	7.2
	10/29/14	<100	<2.5	<1.8	<9.6	<5.4	<1.4	<1.1	**58.6**	**1.5**	**998**	**1,280**	<4.9	<2.7	<1.2	NA	<3.0	<3.1	<9.7	<2.1	<2.1	<4.6	<2.6	23.2	<2.9	**1,030**	<6.2	<6.6	<6.6	<2.3
	05/26/15	20	<0.048	<0.062	<0.24	<0.22	0.7	<0.079	**99**	**2**	**1,700**	**2,700**	14	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	41	<0.066	**640**	**0.64**	NA	<0.12	<0.044
	10/29/15	39	<0.48	<0.62	<2.4	<2.2	<0.76	<0.79	**72**	<0.66	**1,800**	**1,900**	5.5	<1.1	<0.50	NA	<0.61	<0.89	<0.83	<0.42	<0.42	<0.98	<0.44	30	<0.66	**1,400**	<0.97	NA	<1.2	<0.44
	05/10/16	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0	**84**	<5.0	**1,800**	**2,000**	6.6	<5.0	<5.0	NA	<5.0	<5.0	<10	<5.0	<10	<5.0	<5.0	34	<5.0	**1,600**	<5.0	NA	<10	<5.0
	08/12/16	<1,000	<20	<10	<400	<40	<40	<40	**40**	<20	**500**	**860**	<20	<20	<10	<1,000	<20	<20	<100	<20	<40	<20	<20	<20	<20	**500**	<40	NA	<40	<20
	11/28/16	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0	**90**	<5.0	**2,100**	**2,100**	6.2	<5.0	<5.0	**38**	<5.0	<5.0	<10	<5.0	<10	<5.0	<5.0	32	<5.0	**1,400**	<5.0	NA	<10	<5.0

Table 7
Historical Groundwater VOC Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Well ID	Sample Date	Acetone	Benzene	Bromodichloromethane	2-Butanone (MEK)	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Diisopropyl ether	1,4-Dioxane	Ethylbenzene	p-Isopropyltoluene	Methylene Chloride	Methyl-tert-butyl ether	Naphthalene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride	Xylene (Total)	m&p-Xylene	o-Xylene
2L Standard		**6,000**	**1**	**0.6**	**4,000**	**3,000**	**70**	**3**	**6**	**0.4**	**350**	**70**	**100**	**0.6**	**70**	**3**	**600**	**25**	**5**	**20**	**6**	**0.7**	**600**	**200**	**0.6**	**3**	**0.03**	**500**	**500**	**500**
MW-7B	01/22/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**7.2**	<1.0	84.4	**193**	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	4.9	<1.0	**328**	<1.0	NA	<2.0	<1.0
	08/28/09	128	<2.0	<2.0	<10.0	<2.0	<2.0	<2.0	**6.2**	<2.0	35.1	**153**	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<4.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**231**	<2.0	NA	<4.0	<2.0
	05/06/10	<50.0	<2.0	<2.0	11.5	<2.0	<2.0	**6.1**	**10**	<2.0	99.3	**240**	2.8	<2.0	<2.0	NA	<2.0	<2.0	<4.0	<2.0	<2.0	<2.0	<2.0	6.2	<2.0	**262**	<2.0	NA	<4.0	<2.0
	10/21/10	<50.0	<2.0	<2.0	<10.0	<2.0	<2.0	<2.0	**12.3**	<2.0	162	**318**	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<4.0	<2.0	<2.0	<2.0	<2.0	7.9	<2.0	**356**	<2.0	NA	<4.0	<2.0
	04/26/11	<50.0	<2.0	<2.0	<10.0	<2.0	<2.0	<2.0	**10.1**	<2.0	139	**258**	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<4.0	<2.0	<2.0	<2.0	<2.0	6.3	<2.0	**265**	<2.0	NA	<4.0	<2.0
	10/26/11	<50.0	<2.0	<2.0	<10.0	<2.0	<2.0	<2.0	**12.6**	<2.0	183	**308**	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<4.0	<2.0	<2.0	<2.0	<2.0	6.7	<2.0	**275**	<2.0	NA	<4.0	<2.0
	05/22/12	<50.0	<2.0	<2.0	<10.0	<2.0	<2.0	<2.0	**12.7**	<2.0	180	**312**	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<4.0	<2.0	<2.0	<2.0	<2.0	6.2	<2.0	**255**	<2.0	NA	<4.0	<2.0
	10/24/12	<50.0	<2.0	<2.0	28	<2.0	<2.0	<2.0	**13.9**	<2.0	224	**378**	<2.0	<2.0	<2.0	NA	<2.0	<2.0	<4.0	<2.0	<2.0	<2.0	<2.0	6.8	<2.0	**259**	<2.0	<4.0	<4.0	<2.0
	10/24/12 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**16.3**	<1.0	223	**358**	2	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	8	<1.0	**263**	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	**13.5**	<1.0	207	**293**	1.5	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	6.9	<1.0	**299**	<1.0	<2.0	<2.0	<1.0
	10/30/13	<50.0	<2.0	<2.0	<10.0	<2.0	<2.0	<2.0	**12.7**	<2.0	204	**331**	2.2	<2.0	<2.0	NA	<2.0	<2.0	<4.0	<2.0	<2.0	<2.0	<2.0	5.5	<2.0	**244**	<2.0	<4.0	<4.0	<2.0
	04/28/14	<20.0	<0.50	<0.36	<1.9	<1.1	<0.28	<0.22	**15**	0.36	252	**365**	1.7	<0.54	<0.24	NA	<0.60	<0.62	3.5	<0.42	<0.42	<0.92	<0.52	6.8	<0.58	**280**	<1.2	<1.3	<1.3	<0.46
	10/29/14	114	<0.62	<0.45	<2.4	<1.4	<0.35	<0.28	**16.5**	**0.42**	322	**372**	1.6	<0.68	<0.30	NA	<0.75	<0.78	<2.4	<0.52	<0.52	<1.2	<0.65	5.8	<0.72	**282**	<1.6	<1.6	<1.6	<0.58
	05/26/15	52	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	**22**	**0.54**	**550**	**570**	2.2	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	9.7	<0.066	**410**	<0.097	NA	<0.12	<0.044
	10/29/15	46	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	**22**	**0.51**	**410**	**400**	2.1	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	7.7	<0.066	**290**	<0.097	NA	<0.12	<0.044
	05/10/16	23	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	**39**	**0.91**	**640**	**610**	2.9	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	16	<0.5	**440**	<0.5	NA	<1.0	<0.5
	05/10/16 DUP	26	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	**41**	**0.98**	**650**	**730**	3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	1.4	<0.5	<0.5	16	<0.5	**440**	<0.5	NA	<1.0	<0.5
	08/11/16	<250	<5.0	<2.5	<100	<10	<10	<10	**20**	<5.0	**370**	**400**	<5.0	<5.0	<2.5	<250	<5.0	<5.0	<25	<5.0	<10	<5.0	<5.0	5.4	<5.0	**230**	<10	NA	<10	<5.0
	11/28/16	8.8	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	**24**	**0.66**	**430**	**410**	1.7	<0.5	<0.5	**14**	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	6.9	<0.5	**190**	<0.5	NA	<1.0	<0.5
MW-7C	08/11/16	<500	<10	<5.0	<200	<20	<20	<20	**40**	<10	**1,000**	**580**	<10	<10	<5.0	<500	<10	<10	<50	<10	<20	<10	<10	15	<10	**310**	<20	NA	<20	<10
	11/28/16	<50	<5.0	<5.0	<50	<5.0	<5.0	<5.0	**62**	<5.0	**2,200**	**870**	8.4	<5.0	<5.0	**13**	<5.0	<5.0	<10	<5.0	<10	<5.0	<5.0	27	<5.0	**430**	<5.0	NA	<10	<5.0
MW-8	01/21/09	<25.0	**4.6**	**1**	<5.0	3.9	<1.0	<1.0	**1,950**	**38.4**	**15,800**	**46,000**	**168**	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	**21.9**	5.2	**3,090**	**27.7**	**21,500**	**6.8**	NA	<2.0	<1.0
	08/27/09	<6,250	<250	<250	<1,250	<250	<250	<250	**1,970**	<250	**16,300**	**48,400**	<250	<250	<250	NA	<250	<250	<500	<250	<250	<250	<250	**2,910**	<250	**17,800**	<250	NA	<500	<250
	05/06/10	<6,250	<250	<250	<1,250	<250	<250	**675**	**2,240**	<250	**15,600**	**47,500**	<250	<250	<250	NA	<250	<250	<500	<250	<250	<250	<250	**2,900**	<250	**15,200**	<250	NA	<500	<250
	10/21/10	<12,500	<500	<500	<2,500	<500	<500	<500	**2,490**	<500	**18,800**	**53,900**	<500	<500	<500	NA	<500	<500	<1,000	<500	<500	<500	<500	**3,250**	<500	**20,500**	<500	NA	<1000	<500
	04/26/11	<12,500	<500	<500	<2,500	<500	<500	<500	**2,910**	<500	**23,800**	**55,300**	<500	<500	<500	NA	<500	<500	<1,000	<500	<500	<500	<500	**4,330**	<500	**19,700**	<500	NA	<1000	<500
	04/26/11 DUP	<25.0	**3.4**	<1.0	<5.0	2.9	11.9	<1.0	**2,920**	**64.8**	**21,300**	**62,000**	**235**	<1.0	<1.0	NA	<1.0	<1.0	**5.5**	<1.0	<1.0	**19.3**	8.7	**3,690**	**31.9**	**15,600**	**1.5**	NA	<2.0	1.1
	10/26/11	<12,500	<500	<500	<2,500	<500	<500	<500	**3,110**	<500	**24,200**	**59,200**	<500	<500	<500	NA	<500	<500	<1,000	<500	<500	<500	<500	**3,820**	<500	**19,300**	<500	NA	<1000	<500
	05/22/12	<12,500	<500	<500	<2,500	<500	<500	<500	**2,690**	<500	**21,100**	**48,700**	<500	<500	<500	NA	<500	<500	<1,000	<500	<500	<500	<500	**3,550**	<500	**20,100**	<500	NA	<1000	<500
	10/24/12	<10,000	<400	<400	<2000	<400	<400	<400	**3,300**	<400	**27,500**	**67,800**	<400	<400	<400	NA	<400	<400	<800	<400	<400	<400	<400	**3,870**	<400	**20,100**	<400	<800	<800	<400
	04/30/13	<25.0	**7.9**	<1.0	<5.0	4.4	<1.0	<1.0	**2,870**	**94.4**	**20,500**	**49,700**	<250	<1.0	<1.0	NA	<1.0	<1.0	**6.2**	<1.0	<1.0	**25.1**	73.1	**3,050**	**95.2**	**19,800**	**1.7**	2	<2.0	<1.0
	10/30/13	<12,500	<500	<500	<2,500	<500	<500	<500	**2,010**	<500	**13,600**	**40,700**	<500	<500	<500	NA	<500	<500	<1,000	<500	<500	<500	<500	**1,790**	<500	**14,700**	<500	<1000	<1000	<500
	04/28/14	<2,500	<62.5	<45.0	<240	<135	<35.0	<27.5	**2,040**	<30.0	**13,100**	**41,900**	<122	<67.5	<30.0	NA	<75.0	<77.5	**715**	<52.5	<52.5	<115	<65.0	**2,100**	<72.5	**15,400**	<155	<165	<165	<57.5
	10/29/14	<5,000	<125	<90.0	<480	<270	<70.0	<55.0	**2,240**	**75.5**	**18,200**	**43,200**	<245	<135	<60.0	NA	<150	<155	<485	<105	<105	<230	<130	**1,990**	<145	**16,300**	<310	<330	<330	<115
	05/26/15	98	<0.95	<1.2	<4.9	<4.3	17	<1.6	**2,900**	**100**	**23,000**	**62,000**	**320**	<2.2	<1.0	NA	<1.2	<1.8	<1.7	<0.85	<0.85	**28**	<0.88	**2,700**	**53**	**22,000**	<1.9	NA	<2.3	<0.89
	10/29/15	<31	<4.8	<6.2	<24	<22	<7.6	<7.9	**2,700**	**82**	**21,000**	**45,000**	91	<11	<5.0	NA	<6.1	<8.9	<8.3	<4.2	<4.2	<9.8	<4.4	**1,800**	**59**	**22,000**	<9.7	NA	<12	<4.4
	05/10/16	<500	<50	<50	<500	<50	<50	<50	**3,300**	**95**	**22,000**	**52,000**	88	<50	<50	**4,500**	<50	<50	<100	<50	<100	<50	<50	**3,100**	<50	**18,000**	<50	NA	<100	<50
	05/10/16 DUP	<500	<50	<50	<500	<50	<50	<50	**2,900**	**100**	**23,000**	**55,000**	94	<50	<50	NA	<50	<50	<100	<50	<100	<50	<50	**3,200**	<50	**17,000**	<50	NA	<100	<50
	08/12/16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3,200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/30/16	<500	<50	<50	<500	<50	<50	<50	**2,700**	**85**	**21,000**	**60,000**	79	<50	<50	**3,300**	<50	<50	<100	<50	<100	<50	<50	**1,700**	**71**	**22,000**	<50	NA	<100	<50

Table 7
Historical Groundwater VOC Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Well ID	Sample Date	Acetone	Benzene	Bromodichloromethane	2-Butanone (MEK)	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Diisopropyl ether	1,4-Dioxane	Ethylbenzene	p-Isopropyltoluene	Methylene Chloride	Methyl-tert-butyl ether	Naphthalene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride	Xylene (Total)	m&p-Xylene	o-Xylene
2L Standard		**6,000**	**1**	**0.6**	**4,000**	**3,000**	**70**	**3**	**6**	**0.4**	**350**	**70**	**100**	**0.6**	**70**	**3**	**600**	**25**	**5**	**20**	**6**	**0.7**	**600**	**200**	**0.6**	**3**	**0.03**	**500**	**500**	**500**
MW-9	01/26/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.6	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	08/27/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/06/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	2.9	<1.0	27.2	65.3	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	**37.6**	<1.0	NA	<2.0	<1.0
	10/21/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	3	<1.0	46.5	62.5	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	2.2	<1.0	**65.8**	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	4.7	<1.0	93.1	**113**	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	3.6	<1.0	**93.1**	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	4.7	<1.0	97	**101**	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	3.1	<1.0	**77.9**	<1.0	NA	<2.0	<1.0
	05/22/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	3.2	<1.0	57.4	63.2	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	1.8	<1.0	**51.3**	<1.0	NA	<2.0	<1.0
	10/24/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	5.4	<1.0	115	**122**	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	3.2	<1.0	**77.5**	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	5.9	<1.0	148	**131**	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	3.3	<1.0	**106**	<1.0	<2.0	<2.0	<1.0
	10/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	5.3	<1.0	145	**117**	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	2.7	<1.0	**93.2**	<1.0	<2.0	<2.0	<1.0
	04/28/14	<10.0	<0.25	<0.18	<0.96	<0.54	0.29	<0.11	3.8	<0.12	92.6	**81.8**	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	2	<0.29	**63.4**	<0.62	<0.66	<0.66	<0.23
	10/29/14	95.9	<0.25	<0.18	<0.96	<0.54	0.31	<0.11	4.8	<0.12	125	**95.4**	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	2	<0.29	**74**	<0.62	<0.66	<0.66	<0.23
	05/26/15	56	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	5.2	<0.066	220	**130**	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	2.4	<0.066	**78**	<0.097	NA	<0.12	<0.044
	10/29/15	47	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	5.8	<0.066	120	**81**	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	2.5	<0.066	**83**	<0.097	NA	<0.12	<0.044
	05/10/16	23	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	6	<0.5	140	**100**	<0.5	<0.5	<0.5	NA	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	2.4	<0.5	**76**	<0.5	NA	<1.0	<0.5
	11/28/16	<5.0	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	4.5	<0.5	110	**81**	<0.5	<0.5	<0.5	**320**	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	1.4	<0.5	**51**	<0.5	NA	<1.0	<0.5
MW-9A	01/26/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	3	<1.0	42.3	68.5	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	2.7	<1.0	**73.8**	<1.0	NA	<2.0	<1.0
	08/27/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.5	<1.0	16.8	13.3	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**44.3**	<1.0	NA	<2.0	<1.0
	08/27/09 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	1.5	<1.0	1.5	<1.0	15.7	13.4	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**46**	<1.0	NA	<2.0	<1.0
	05/06/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.4	<1.0	11.2	13.5	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**22.9**	<1.0	NA	<2.0	<1.0
	10/21/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.6	<1.0	14	14.4	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**34.2**	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.8	<1.0	17.4	16.1	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**38.7**	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	2	<1.0	21.2	19.5	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**39.7**	<1.0	NA	<2.0	<1.0
	05/22/12	31.4	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.7	<1.0	17.1	18.2	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**38.3**	<1.0	NA	<2.0	<1.0
	10/24/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	2.1	<1.0	21.4	22	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**36.5**	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.6	<1.0	20.7	24.4	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**43.4**	<1.0	<2.0	<2.0	<1.0
	10/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	1.6	<1.0	21.6	24.2	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**39.1**	<1.0	<2.0	<2.0	<1.0
	04/28/14	<10.0	<0.25	<0.18	<0.96	<0.54	0.27	<0.11	1.6	<0.12	20.6	25.8	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	**38.2**	<0.62	<0.66	<0.66	<0.23
	10/29/14	95.2	<0.25	<0.18	<0.96	<0.54	0.26	<0.11	1.7	<0.12	23.3	26.2	<0.49	<0.27	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	**37**	<0.62	<0.66	<0.66	<0.23
	05/26/15	21	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	2.1	<0.066	29	39	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	0.63	<0.066	**46**	<0.097	NA	<0.12	<0.044
	10/29/15	60	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	1.8	<0.066	23	24	<0.094	<0.11	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	0.95	<0.066	**39**	<0.097	NA	<0.12	<0.044
	05/10/16	27	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	2.2	<0.5	26	31	<0.5	<0.5	<0.5	NA	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	**42**	<0.5	NA	<1.0	<0.5
	11/28/16	<5.0	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	1.7	<0.5	18	21	<0.5	<0.5	<0.5	**63**	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	**26**	<0.5	NA	<1.0	<0.5

Table 7
Historical Groundwater VOC Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Well ID	Sample Date	Acetone	Benzene	Bromodichloromethane	2-Butanone (MEK)	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Diisopropyl ether	1,4-Dioxane	Ethylbenzene	p-Isopropyltoluene	Methylene Chloride	Methyl-tert-butyl ether	Naphthalene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride	Xylene (Total)	m&p-Xylene	o-Xylene
2L Standard		**6,000**	**1**	**0.6**	**4,000**	**3,000**	**70**	**3**	**6**	**0.4**	**350**	**70**	**100**	**0.6**	**70**	**3**	**600**	**25**	**5**	**20**	**6**	**0.7**	**600**	**200**	**0.6**	**3**	**0.03**	**500**	**500**	**500**
MW-10	01/23/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**12.5**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	<1.0	NA	<2.0	<1.0
	08/28/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**11.5**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/06/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	2.3	<1.0	<1.0	<1.0	<1.0	<1.0	**9.8**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	NA	<2.0	<1.0
	10/21/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**10.5**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**10.8**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**9.8**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/22/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**8.9**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/24/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**9.6**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**7.8**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	10/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**7.9**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/28/14	<10.0	<0.25	<0.18	<0.96	<0.54	0.29	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	**7**	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	0.83	<0.62	<0.66	<0.66	<0.23
	10/29/14	92.7	<0.25	<0.18	<0.96	<0.54	0.37	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	**7.8**	<0.12	NA	<0.30	<0.31	<0.97	0.25	<0.21	<0.46	<0.26	<0.48	<0.29	0.88	<0.62	<0.66	<0.66	<0.23
	05/26/15	14	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	**8.9**	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	2.2	<0.097	NA	<0.12	<0.044
	10/29/15	50	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	0.6	<0.056	<0.094	**7.9**	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	0.9	<0.097	NA	<0.12	<0.044
	05/10/16	23	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	1.4	<0.5	<0.5	**7.7**	<0.5	NA	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	1	<0.5	NA	<1.0	<0.5
	11/29/16	<5.0	<0.5	<0.5	<5.0	<0.5	0.58	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**6.1**	<0.5	**13**	<0.5	<0.5	<1.0	0.71	<1.0	<0.5	<0.5	<0.5	<0.5	0.66	<0.5	NA	<1.0	<0.5
MW-10A	01/23/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**22.2**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	08/28/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**23.1**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/06/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**13.7**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/21/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**8.7**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**7.6**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**6.4**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/22/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**5.2**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/24/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**5.6**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**4.8**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	10/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**5.6**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/28/14	12	<0.25	<0.18	<0.96	<0.54	<0.14	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	**6.2**	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	<0.47	<0.62	<0.66	<0.66	<0.23
	10/29/14	106	<0.25	<0.18	<0.96	<0.54	<0.14	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	**6.1**	<0.12	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	<0.47	<0.62	<0.66	<0.66	<0.23
	05/26/15	20	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	**6.4**	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	<0.078	<0.097	NA	<0.12	<0.044
	10/29/15	62	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	**5.4**	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	<0.078	<0.097	NA	<0.12	<0.044
	05/10/16	34	<0.5	<0.5	0.51	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**5.4**	<0.5	NA	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	<1.0	<0.5
	11/29/16	<5.0	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	1.4	<0.5	**4.7**	<0.5	**6.2**	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	NA	<1.0	<0.5

Table 7
Historical Groundwater VOC Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Well ID	Sample Date	Acetone	Benzene	Bromodichloromethane	2-Butanone (MEK)	Chloroethane	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	Diisopropyl ether	1,4-Dioxane	Ethylbenzene	p-Isopropyltoluene	Methylene Chloride	Methyl-tert-butyl ether	Naphthalene	Tetrachloroethene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride	Xylene (Total)	m&p-Xylene	o-Xylene
2L Standard		**6,000**	**1**	**0.6**	**4,000**	**3,000**	**70**	**3**	**6**	**0.4**	**350**	**70**	**100**	**0.6**	**70**	**3**	**600**	**25**	**5**	**20**	**6**	**0.7**	**600**	**200**	**0.6**	**3**	**0.03**	**500**	**500**	**500**
MW-11	01/22/09	<25.0	<1.0	<1.0	<5.0	<1.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**57**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	<1.0	NA	<2.0	<1.0
	08/28/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**49.8**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0	NA	<2.0	<1.0
	05/06/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**40.3**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/06/10 DUP	<50.0	<2.0	<2.0	<10.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	**39.4**	<2.0	NA	<2.0	<2.0	<4.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	<4.0	<2.0
	10/21/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**39**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	NA	<2.0	<1.0
	10/21/10 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**36.8**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**38.1**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**34.2**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/22/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**30.3**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/22/12 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/24/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**28.6**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**23.1**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/30/13 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**26.5**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	10/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**21.6**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/28/14	12.2	<0.25	<0.18	<0.96	<0.54	0.34	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	**19.9**	<0.12	NA	<0.30	<0.31	<0.97	0.25	<0.21	<0.46	<0.26	<0.48	<0.29	0.48	<0.62	<0.66	<0.66	<0.23
	10/29/14	108	<0.25	<0.18	<0.96	<0.54	0.4	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	**19.7**	0.13	NA	<0.30	<0.31	<0.97	<0.21	<0.21	<0.46	<0.26	<0.48	<0.29	0.48	<0.62	<0.66	<0.66	<0.23
	05/26/15	18	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	**22**	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	1.2	<0.097	NA	<0.12	<0.044
	10/29/15	62	<0.048	<0.062	1	<0.22	<0.076	<0.079	<0.083	<0.066	0.56	<0.056	<0.094	**19**	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	0.6	<0.097	NA	<0.12	<0.044
	10/29/15 DUP	58	<0.048	<0.062	<0.24	<0.22	<0.076	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	**19**	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	<0.078	<0.097	NA	<0.12	<0.044
	05/10/16	52	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**19**	<0.5	NA	<0.5	<0.5	<1.0	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	0.52	<0.5	NA	<1.0	<0.5
	11/29/16	<5.0	<0.5	<0.5	<5.0	<0.5	0.73	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**15**	<0.5	**3.1**	<0.5	<0.5	<1.0	0.86	<1.0	<0.5	<0.5	<0.5	<0.5	0.65	<0.5	NA	<1.0	<0.5
MW-11A	01/22/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**50.2**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	NA	<2.0	<1.0
	08/28/09	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**48.5**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	NA	<2.0	<1.0
	05/06/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**40.5**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/21/10	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**38**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	<1.0	NA	<2.0	<1.0
	04/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**35.1**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/26/11	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**33.9**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/22/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**27.1**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	05/22/12 DUP	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**26.9**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<2.0	<1.0
	10/24/12	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**26.2**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**23**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	10/30/13	<25.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**21.6**	<1.0	NA	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<1.0
	04/28/14	<10.0	<0.25	<0.18	<0.96	<0.54	0.47	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	**20**	<0.12	NA	<0.30	<0.31	<0.97	0.22	<0.21	<0.46	<0.26	<0.48	<0.29	0.68	<0.62	<0.66	<0.66	<0.23
	10/29/14	106	<0.25	<0.18	<0.96	<0.54	0.52	<0.11	<0.32	<0.12	<0.56	<0.19	<0.49	**20.1**	<0.12	NA	<0.30	<0.31	<0.97	0.26	<0.21	<0.46	<0.26	<0.48	<0.29	0.64	<0.62	<0.66	<0.66	<0.23
	05/26/15	26	<0.048	<0.062	<0.24	<0.22	0.61	<0.079	<0.083	<0.066	<0.083	<0.056	<0.094	**22**	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	1.2	<0.097	NA	<0.12	<0.044
	10/29/15	49	<0.048	<0.062	<0.24	<0.22	0.57	<0.079	<0.083	<0.066	0.52	<0.056	<0.094	**19**	<0.050	NA	<0.061	<0.089	<0.083	<0.042	<0.042	<0.098	<0.044	<0.061	<0.066	0.54	<0.097	NA	<0.12	<0.044
	05/10/16	19	<0.50	<0.50	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	1.4	<0.50	<0.50	**17**	<0.50	NA	<0.50	<0.50	<1.0	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	0.73	<0.50	NA	<1.0	<0.50
	11/29/16	<5.0	<0.50	<0.50	<5.0	<0.50	0.71	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**16**	<0.50	<3.0	<0.50	<0.50	<1.0	0.52	<1.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<1.0	<0.50

Notes:
Analytical results compared to North Carolina Administrative Code 15A 2L Groundwater Quality Standards (revised April 1, 2013)
Only those compounds detected in at least one sample are shown above
All data is presented in micrograms per liter (µg/L)
Bold values indicate exceedance of 2L Standard
J Estimated concentration below laboratory reporting limit
NA Not analyzed
NR Not Reported

Table 8
Historical Groundwater Chromium Analytical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Date	MW-1	MW-2	MW-4	MW-5	MW-6	MW-7A	MW-7B	MW-8	MW-9	MW-9A	MW-10	MW-10A	MW-11	MW-11A
2/11/1993	0.01	**0.04**	**0.52**	**0.09**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5/13/1993	**0.08**	**0.22**	**0.48**	**0.08**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8/12/1993	<0.01	<0.01	**0.38**	<0.01	<0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/9/1993	<0.01	<0.01	**0.25**	<0.01	<0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
8/17/1994	0.006	NA	**0.29**	<0.005	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/21/1995	0.006	**0.013**	**0.17**	<0.005	**0.02**	**0.013**	**0.013**	NA	NA	NA	NA	NA	NA	NA
9/7/1995	<0.01	<0.01	**0.16**	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA	NA	NA	NA
3/14/1996	<0.01	<0.01	**0.23**	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA	NA	NA	NA
10/31/1996	<0.005	<0.005	**0.194**	<0.005	0.0054	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA
4/15/1997	<0.01	<0.01	**0.12**	<0.01	<0.01	<0.01	<0.01	< 0.01	NA	NA	NA	NA	NA	NA
10/7/1997	<0.01	<0.01	**0.16**	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA	NA	NA
4/2/1998	<0.01	<0.01	**0.16**	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA	NA	NA
10/1/1998	<0.01	<0.01	**0.13**	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA	NA	NA
4/8/1999	<0.01	<0.01	**0.13**	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA	NA	NA
10/7/1999	<0.002	<0.002	**0.14**	<0.002	0.0027	<0.002	<0.002	<0.002	NA	NA	NA	NA	NA	NA
4/12/2000	<0.002	<0.002	**0.13**	<0.002	0.0022	0.0027	0.0037	0.0021	NA	NA	NA	NA	NA	NA
10/12/2000	0.0024	0.0044	**0.17**	<0.002	0.013	0.0052	0.0024	0.0024	NA	NA	NA	NA	NA	NA
4/11/2001	<0.002	0.0026	**0.13**	<0.002	<0.002	<0.002	<0.002	0.0034	NA	NA	NA	NA	NA	NA
10/26/2001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4/24/2002	0.0096	<0.0020	0.010	**2.1**	0.004	**0.013**	0.0024	0.0024	NA	NA	NA	NA	NA	NA
11/5/2002	<0.002	**0.018**	**0.27**	<0.002	0.0041	<0.002	0.023	<0.002	NA	NA	NA	NA	NA	NA
5/21/2003	<0.002	<0.002	**0.17**	<0.002	0.0036	0.0025	0.0022	<0.002	NA	NA	NA	NA	NA	NA
11/19/2003	**0.013**	0.003	**0.2**	0.0033	0.0054	0.0023	<0.0022	0.0099	NA	NA	NA	NA	NA	NA
6/3/2004	<0.002	<0.002	**0.18**	<0.002	<0.002	<0.002	0.003	<0.002	NA	NA	NA	NA	NA	NA
12/1/2004	<0.002	<0.002	**0.14**	0.0025	<0.002	0.0041	<0.0022	<0.002	NA	NA	NA	NA	NA	NA
6/16/2005	<0.002	<0.002	**0.10**	<0.002	<0.002	0.0038	<0.002	<0.002	NA	NA	NA	NA	NA	NA
12/15/2005	0.0034	<0.002	**0.15**	<0.002	0.0021	0.0042	0.0037	<0.002	NA	NA	NA	NA	NA	NA
7/18/2006	<0.002	<0.002	**0.10**	<0.002	<0.002	<0.002	0.0039	<0.002	NA	NA	NA	NA	NA	NA
1/4/2007	<0.005	**0.13**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA	NA	NA
8/27/2009	<0.005	<0.005	**0.178**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.0882**	0.009
5/6/2010	NA	NA	**0.174**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0534**	NA
10/21/2010	NA	NA	**0.187**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0629**	NA
4/26/2011	NA	NA	**0.104**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0593**	NA
10/26/2011	NA	NA	**0.142**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0567**	NA
5/22/2012	NA	NA	**0.104**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0167**	NA
10/24/2012	NA	NA	**0.139**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0381**	NA
4/30/2013	NA	NA	**0.0899**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0447**	NA
10/30/2013	NA	NA	**0.109**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.0127**	NA
4/28/2014	NA	NA	**0.0801**	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0072	NA
10/29/2014	NA	NA	**0.113**	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0065	NA
5/27/2015	NA	NA	**0.11**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.028**	NA
10/29/2015	NA	NA	**0.12**	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.038**	NA
5/10/2016	NA	NA	**0.06**	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0069	NA
11/30/2016	NA	NA	**0.12**	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01	NA

Notes:
Bold values indicate exceedance of 2L Groundwater Quality Standard of 0.01 mg/L
All data is presented in milligrams per liter (mg/L)
NA Not analyzed

Table 9
Historical Field Parameter and Geochemical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

		Field Parameters						Geochemical Parameters (mg/L)										
Well ID	Sample Date	Dissolved Oxygen (mg/L)	pH (standard units)	Temperature (°C)	Specific Conductivity (µS/cm)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Nitrate (as N)	Nitrite (as N)	Nitrate/Nitrate (as N)	Manganese	Total Iron	Sulfate	Methane	Carbon Dioxide	Alkalinity (as $CaCO_3$)	Total Phosphorus	Dissolved Phosphorus
MW-1	10/29/15	NA	4.02	18.7	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	4.33	22.6	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/30/16	NA	5.61	17.9	186	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2	10/29/15	NA	6.60	19.3	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	5.51	21.6	9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	08/11/16	7.54	5.21	20.2	76	283	5.89	2.5	<0.10	2.4	0.021	0.24	<1.0	0.0041	17	7	0.081	0.07
	11/30/16	NA	5.37	18.6	81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4	10/29/15	NA	4.13	18.5	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	5.50	17.6	45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/28/16	NA	5.46	17.7	88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5	10/29/15	NA	4.29	16.5	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	4.38	21.3	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/28/16	NA	5.48	15.3	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6	10/29/15	NA	4.23	17.4	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	4.63	22.3	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/30/16	NA	5.83	17.2	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-7A	10/29/15	NA	4.55	16.4	9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	4.52	19.8	9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	08/11/16	2.57	5.46	17.6	87	245	5.71	1.2	<0.10	1.2	0.051	1.8	<1.0	0.0034	26.9	30	0.13	0.14
	11/28/16	NA	5.68	16.0	87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-7B	10/29/15	NA	4.75	16.7	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	4.95	21.6	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	08/11/16	3.67	6.13	17.5	94	145	6.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/28/16	NA	6.53	15.2	103	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-7C	01/27/16	NA	6.61	16.4	115	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	08/11/16	3.67	5.99	18.8	77	224	25.8	0.87	<0.10	0.86	0.017	0.29	2.7	<0.0026	32.3	36	0.19	0.14
	11/28/16	NA	6.22	15.1	106	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 9
Historical Field Parameter and Geochemical Data
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

		Field Parameters						Geochemical Parameters (mg/L)										
Well ID	Sample Date	Dissolved Oxygen (mg/L)	pH (standard units)	Temperature (°C)	Specific Conductivity (µS/cm)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	Nitrate (as N)	Nitrite (as N)	Nitrate/Nitrate (as N)	Manganese	Total Iron	Sulfate	Methane	Carbon Dioxide	Alkalinity (as $CaCO_3$)	Total Phosphorus	Dissolved Phosphorus
MW-8	10/29/15	NA	4.42	18.9	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	4.42	20.7	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	08/11/16	0.32	4.49	21.0	123	295	2.09	0.47	<0.10	0.42	0.19	<0.10	<1.0	0.013	1.47	1.5	<0.062	<0.062
	11/30/16	NA	4.76	17.8	117	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-9	10/29/15	NA	5.19	17.2	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	5.11	18.1	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/28/16	NA	6.21	15.3	107	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-9A	10/29/15	NA	5.14	17.3	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	5.25	19.9	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/28/16	NA	7.19	15.0	177	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-10	10/29/15	NA	5.08	17.2	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	5.49	18.2	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/29/16	NA	6.30	17.4	187	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-10A	10/29/15	NA	5.84	17.4	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	6.47	18.3	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/29/16	NA	7.97	16.9	201	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-11	10/29/15	NA	6.23	17.6	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	9.17	18.7	294	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/29/16	NA	7.31	17.5	231	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-11A	10/29/15	NA	4.97	17.2	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	05/10/16	NA	6.16	18.4	23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/29/16	NA	6.42	18.0	176	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA	Not analyzed
mg/L	Milligrams per liter
µS/cm	Microsiemens per centimeter
mV	Millivolts
NTU	Nephelometric Turbidity Unit

Table 10
Proposed Performance Monitoring Schedule
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Well ID	Parameters	Baseline	3 Months	6 Months	12 Months	18 Months	24 Months	3+ Years (Biennial)
MW-1	VOCs, FP, GP	X	X	X	X	X	X	X
MW-2	VOCs, FP	X		X	X	X	X	X
MW-4	VOCs, FP	X		X	X	X	X	X
MW-5	VOCs, FP	X		X	X	X	X	X
MW-6	VOCs, FP, GP	X	X	X	X	X	X	X
MW-7A	VOCs, FP, GP	X	X	X	X	X	X	X
MW-7B	VOCs, FP	X		X	X	X	X	X
MW-7C	VOCs, FP	X		X	X	X	X	X
MW-8	VOCs, FP, GP	X	X	X	X	X	X	X
MW-9	VOCs, FP, GP	X	X	X	X	X	X	X
MW-9A	VOCs, FP	X		X	X	X	X	X
MW-10	VOCs, FP	X		X	X	X	X	X
MW-10A	VOCs, FP	X		X	X	X	X	X
MW-11	VOCs, FP	X		X	X	X	X	X
MW-11A	VOCs, FP	X		X	X	X	X	X
IW-1	VOCs, FP, GP	X			X		X	X
IW-2	VOCs, FP, GP	X			X		X	X
IW-3	VOCs, FP, GP	X			X		X	X
SW-1	VOCs	X			X		X	
SW-2	VOCs	X			X		X	
SW-3	VOCs	X			X		X	
SW-4	VOCs	X			X		X	

Notes:

VOCs Volatile Organic Compounds (including 1,4-dioxane)

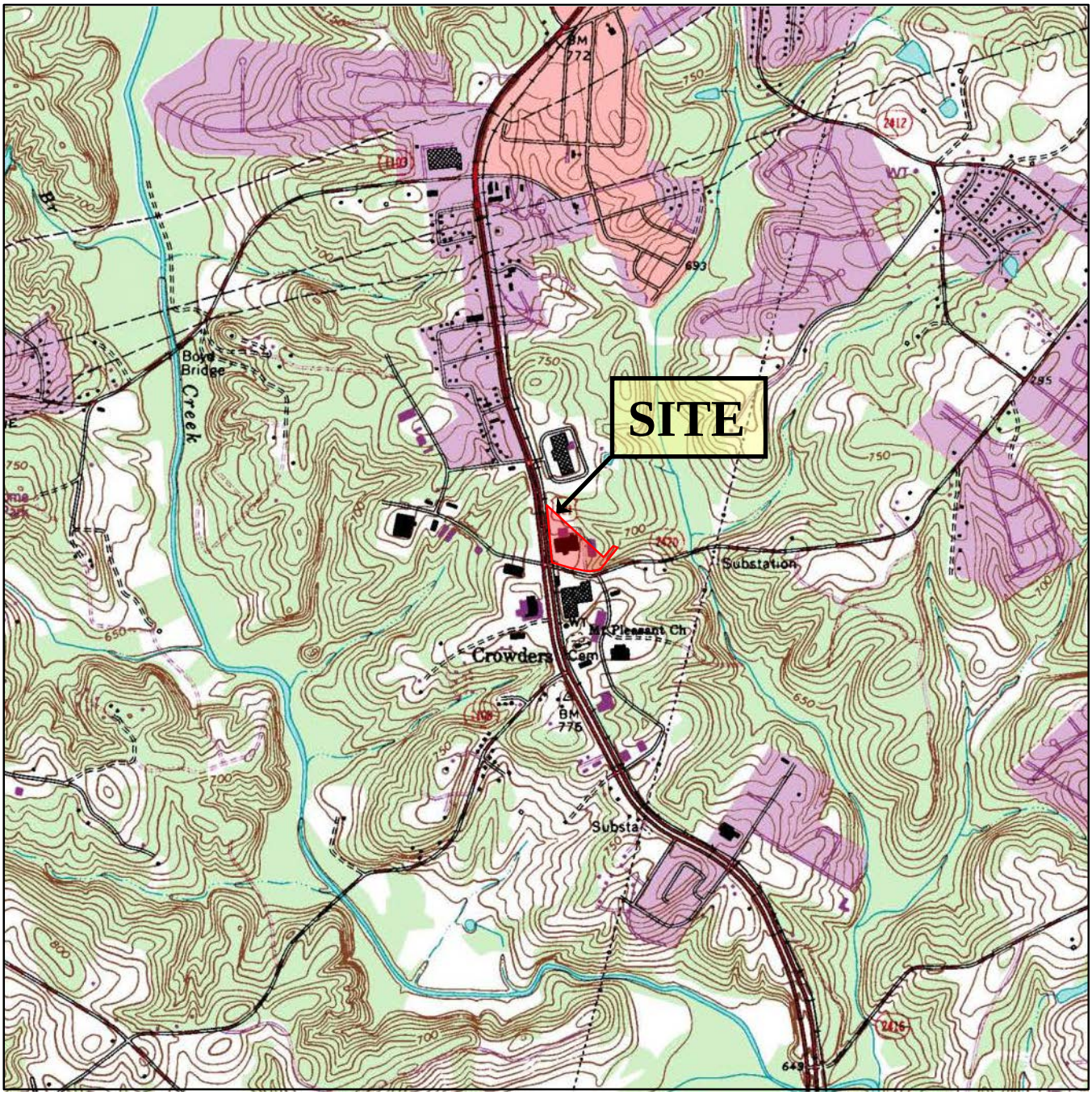
FP Field Parameters - dissolved oxygen, temperature, conductivity, pH, oxidation-reduction potential

GP Geochemical parmeters - total organic carbon, dissolved iron, sulfate, dissolved gases (methane, ethane, ethene)

Table 11
Corrective Measures Cost Summary
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

Task	Cost
Injection Well Installation	$48,440
Baseline Monitoring Event	$12,704
Injection Event	$145,933
Performance Monitoring and Reporting (0-2 years)	$69,786
Biennial Monitoring and Reporting (3-30 years)	$254,352
Total Costs	$531,214

Figures



N

APPROXIMATE

0 2000 4000

SCALE IN FEET

U.S.G.S. QUADRANGLE MAP

GASTONIA SOUTH, NORTH CAROLINA, 1993

QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

TITLE	**SITE LOCATION MAP**
PROJECT	PETTY MACHINE COMPANY 2403 FORBES ROAD GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007 (p) 704-586-0373 (f)

DATE:	4-17-17	REVISION NO:	0
JOB NO:	PTY-001	FIGURE:	1

LEGEND

- SITE PROPERTY BOUNDARY
- STREAM
- SHALLOW MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATION
- PIEZOMETER LOCATION
- SURFACE WATER SAMPLE LOCATION

SUSPECTED TCE SPILL LOCATION

MW-4
MW-9/9A
PZ-1
MW-5
MW-7A
MW-7B
MW-7C
SW-1
MW-8
MW-6
MW-1
MW-3
PZ-2
MW-10/10A
SW-2
SW-4
MW-11/11A
SW-3
PZ-3
ONE STORY BUILDING
ONE STORY BUILDING
MW-2

CAROLINA & NORTHWESTERN RAILROAD

U.S. HIGHWAY 321

FORBES ROAD

PEARSON'S TURNPIKE

N

APPROXIMATE
0 100 200
SCALE IN FEET

TITLE

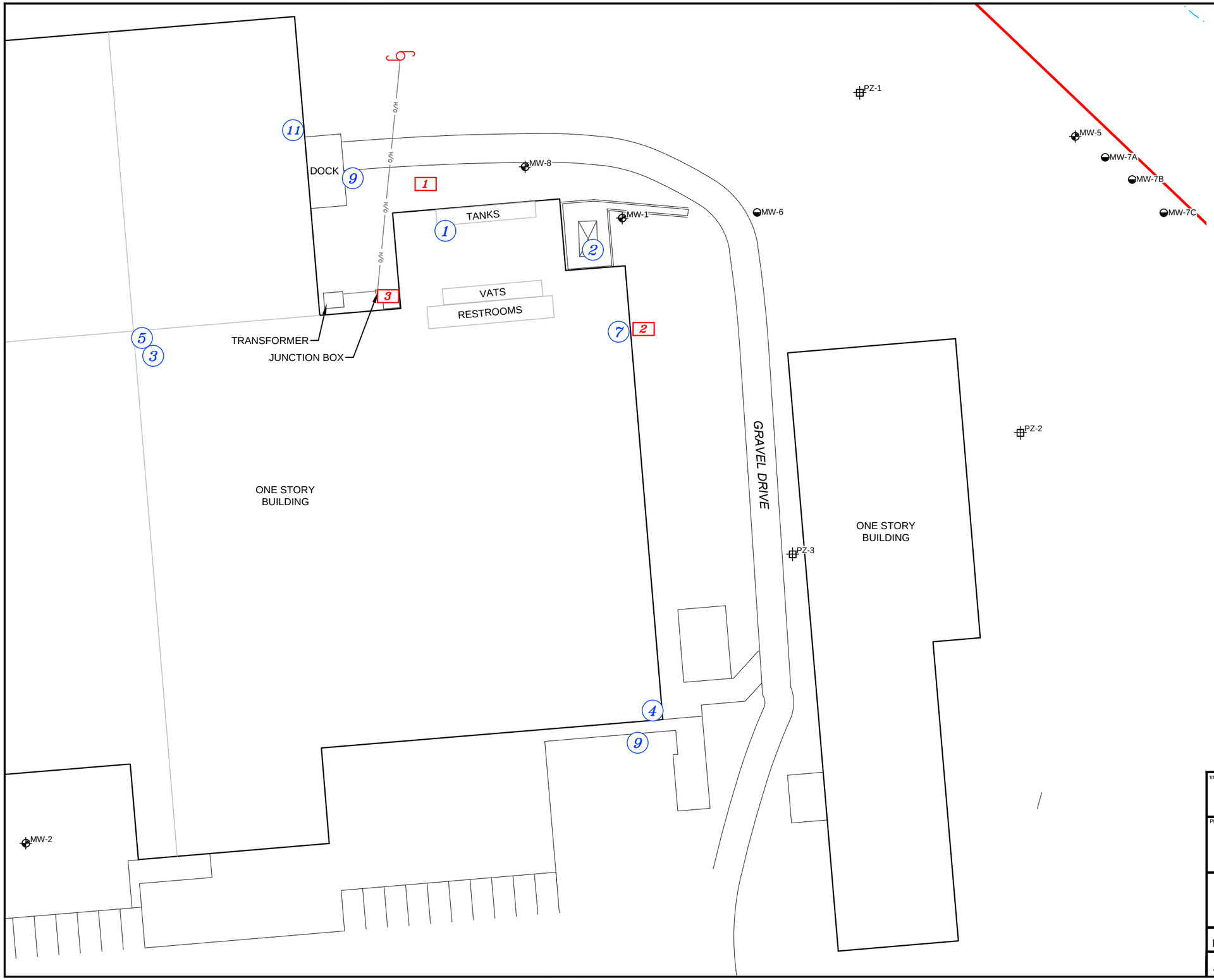
SITE LAYOUT

PROJECT

PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-12-17	REVISION NO. 0
JOB NO. PTY-001	FIGURE NO. 2



LEGEND

- SITE PROPERTY BOUNDARY
- STREAM
- O/H OVERHEAD POWERLINE
- UTILITY POLE
- SHALLOW MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATION
- PIEZOMETER LOCATION
- 1 SWMU ID
- 1 AOC ID

SWMU ID	SWMU DESCRIPTION
SWMU 1	FORMER METAL PLATING BUILDING (HAZARDOUS WASTE STORAGE AREA)
SWMU 2	FORMER HOLDING TANK
SWMU 3	USED OIL MOBILE WET-VAC
SWMU 4	1,000-GALLON USED OIL STORAGE TANK
SWMU 5	WASTE OIL STORAGE DRUM
SWMU 6	PLASMA CUTTER FLOW-DOWN BAGHOUSE (NOT SHOWN)
SWMU 7	SANDBLASTING UNIT
SWMU 8	NON-HAZARDEOUS SATELLITE WASTE STORAGE RECEPTACLES (VARIOUS LOCATIONS)
SWMU 9	MUNICIPAL DUMPSTERS
SWMU 10	SATELLITE SCRAP METAL ACCUMULATION
SWMU 11	SCRAP METAL SORTING AREA

AOC ID	AOC DESCRIPTION
AOC 1	TRICHLOROETHYLENE (TCE) SURFACE RELEASE AREA
AOC 2	SANDBLASTING UNIT VENTILATION SYSTEM
AOC 3	FORMER METAL PLATING BUILDING VENTILATION SYSTEM

NOTE

SWMU = SOLID WASTE MANAGEMENT UNIT

AOC = AREA OF CONCERN

N

APPROXIMATE
0 40 80
SCALE IN FEET

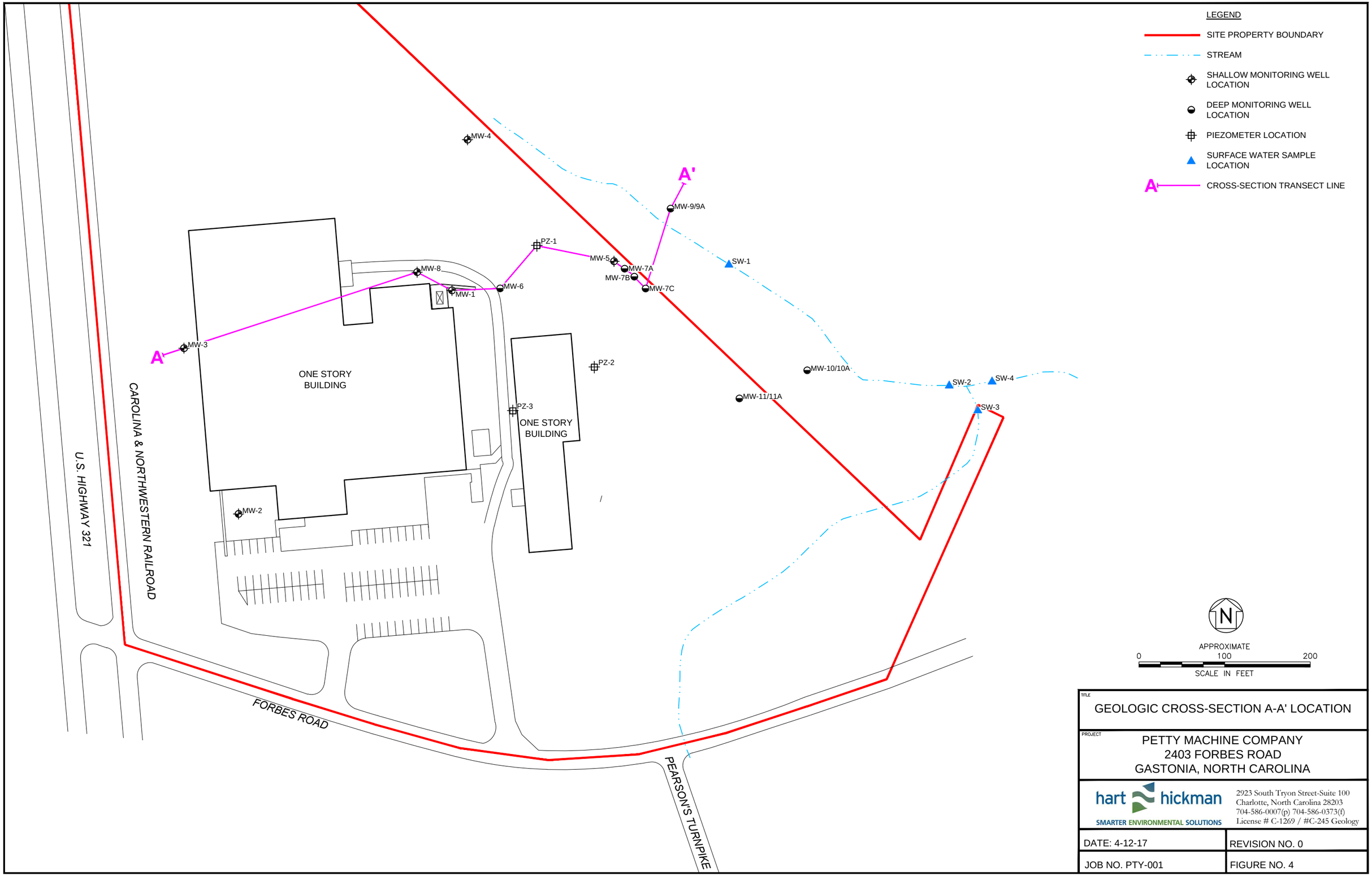
TITLE
SWMU & AOC LOCATIONS

PROJECT
PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-12-17 | REVISION NO. 0

JOB NO. PTY-001 | FIGURE NO. 3



TITLE

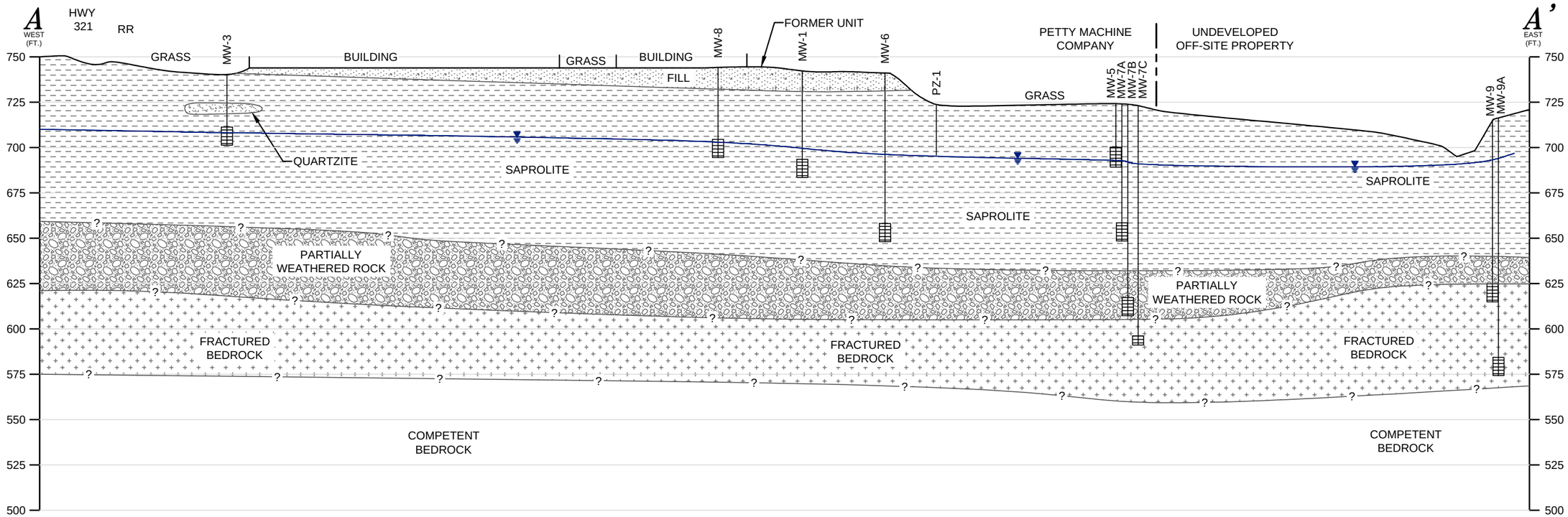
GEOLOGIC CROSS-SECTION A-A' LOCATION

PROJECT

PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-12-17	REVISION NO. 0
JOB NO. PTY-001	FIGURE NO. 4



LEGEND

- FILL
- SAPROLITE
- QUARTZITE
- PARTIALLY WEATHERED ROCK
- FRACTURED BEDROCK
- COMPETENT BEDROCK

MW-3 — MONITORING WELL DEPICTING SCREEN INTERVAL

11/28/16 SHALLOW GROUNDWATER ELEVATION

APPROXIMATE
0 60 120
SCALE IN FEET

NOTE: REFER TO FIGURE 4 OF THIS REPORT FOR CROSS-SECTION TRANSECT.

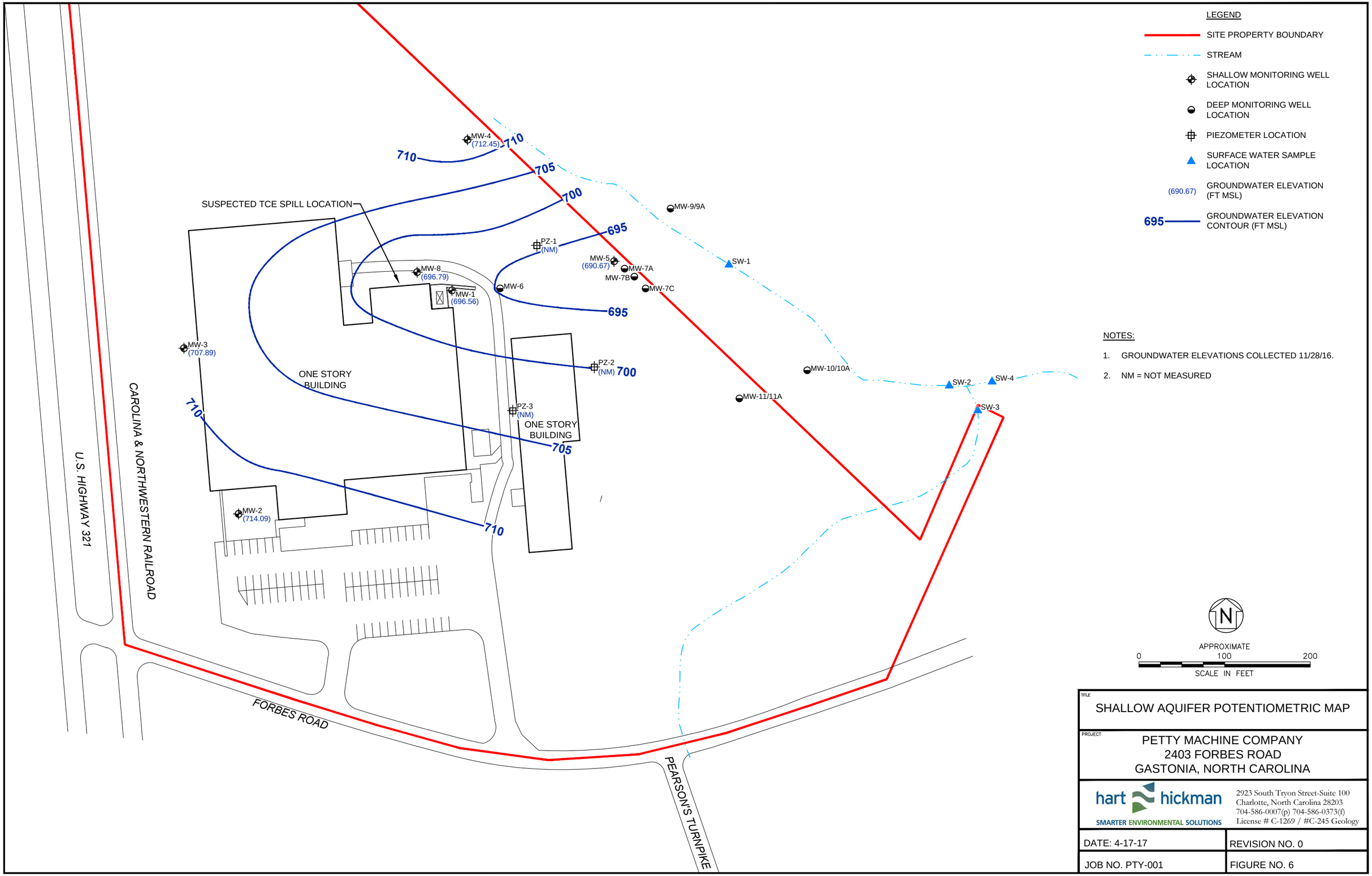
TITLE
GEOLOGIC CROSS-SECTION A-A'

PROJECT
PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 6-9-17 | REVISION NO. 0

JOB NO. PTY-001 | FIGURE NO. 5



TITLE

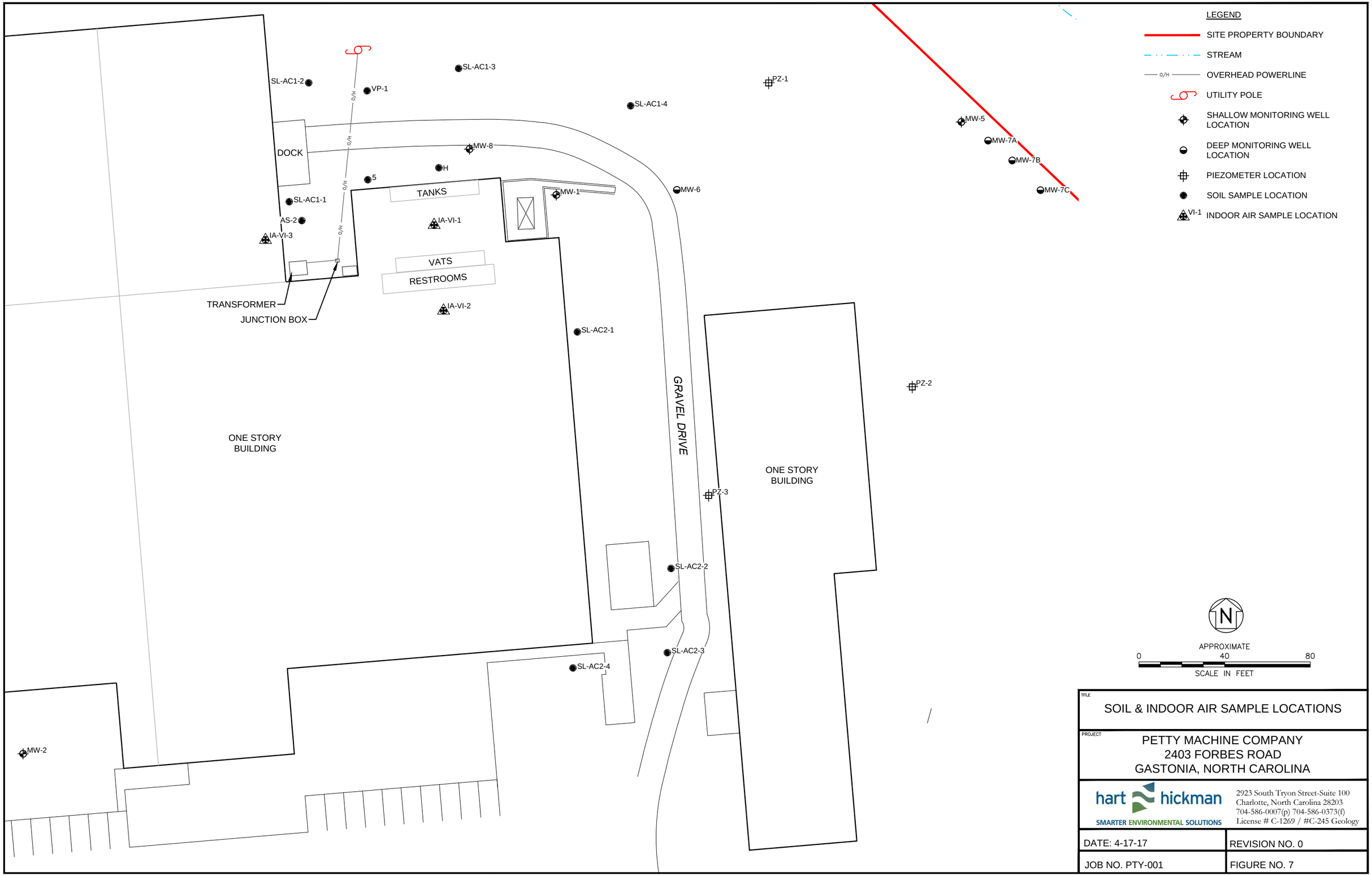
SHALLOW AQUIFER POTENTIOMETRIC MAP

PROJECT

PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-17-17	REVISION NO. 0
JOB NO. PTY-001	FIGURE NO. 6



TITLE

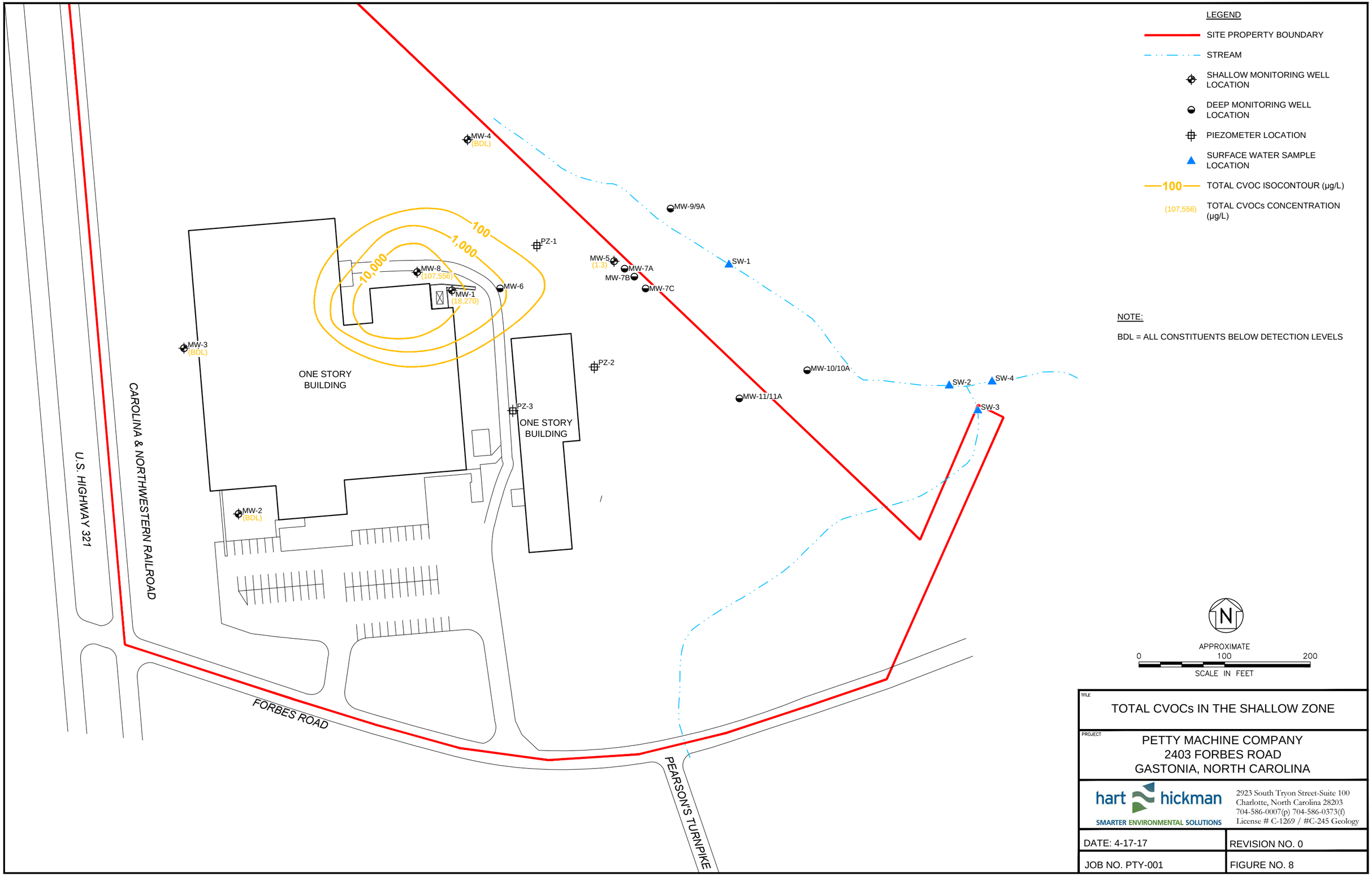
SOIL & INDOOR AIR SAMPLE LOCATIONS

PROJECT

PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-17-17	REVISION NO. 0
JOB NO. PTY-001	FIGURE NO. 7



TITLE

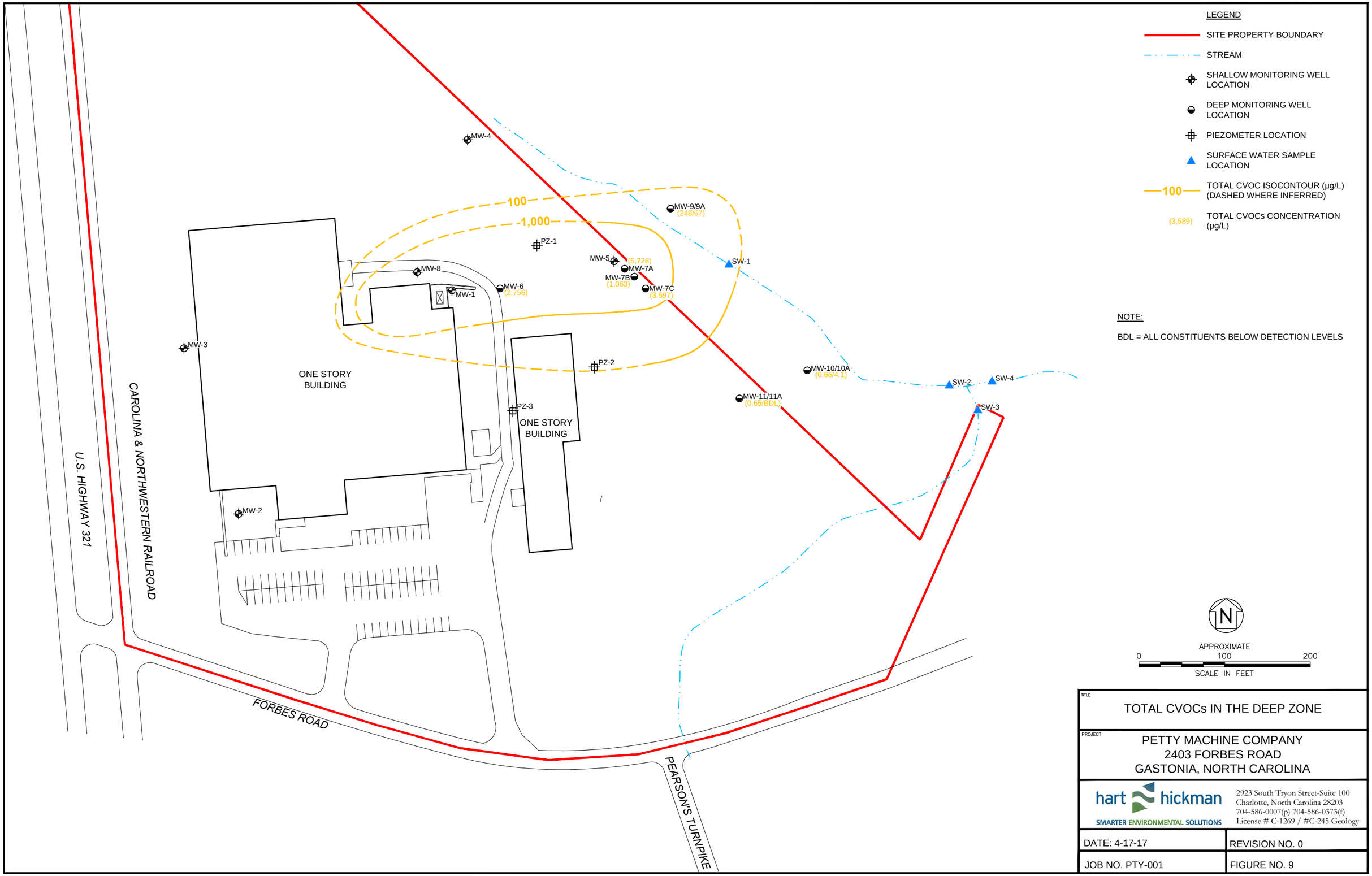
TOTAL CVOCs IN THE SHALLOW ZONE

PROJECT

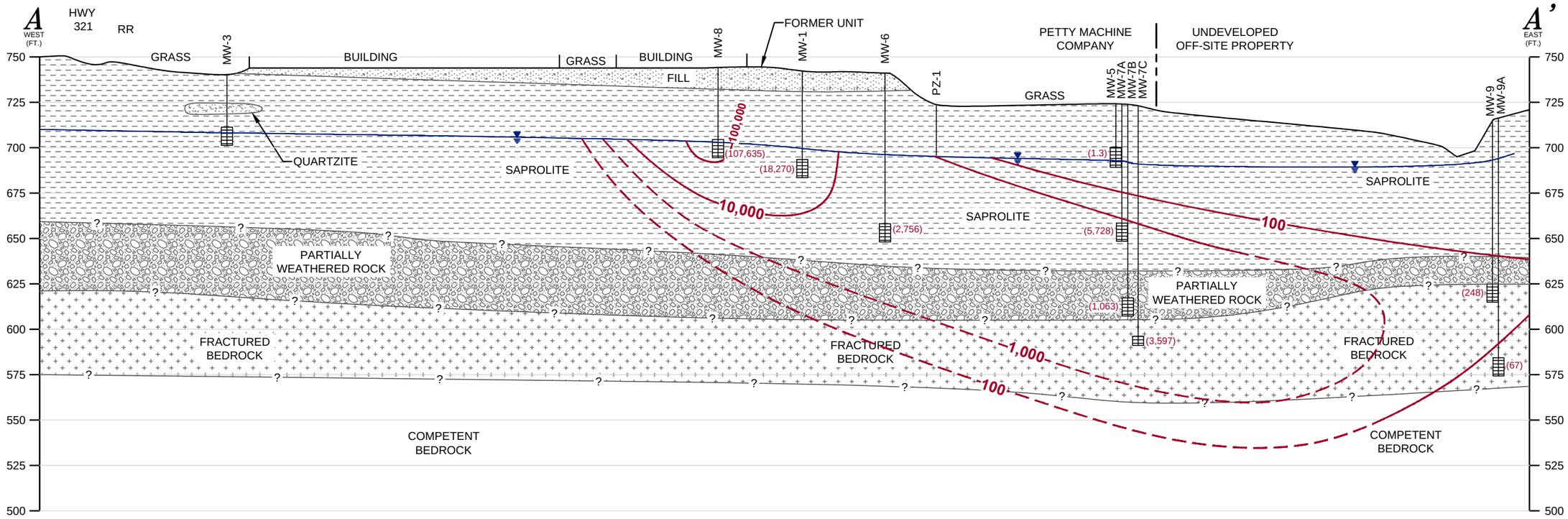
PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-17-17	REVISION NO. 0
JOB NO. PTY-001	FIGURE NO. 8



S:\AAA-Master Projects\Petty Machine Company (PTY)\Figures\Figures.dwg, FIG 9, 4/17/2017 9:44:24 AM, zbarlow



LEGEND

MW-3
MONITORING WELL DEPICTING SCREEN INTERVAL

11/28/16 SHALLOW GROUNDWATER ELEVATION

100 TOTAL CVOC ISOCONTOUR (µg/L) (DASHED WHERE INFERRED)

(2,756) TOTAL CVOCs CONCENTRATION (µg/L)

FILL

SAPROLITE

QUARTZITE

PARTIALLY WEATHERED ROCK

FRACTURED BEDROCK

COMPETENT BEDROCK

NOTE: REFER TO FIGURE 4 OF THIS REPORT FOR CROSS-SECTION TRANSECT.

APPROXIMATE
0 60 120
SCALE IN FEET

TITLE
TOTAL CVOCs, GEOLOGIC CROSS-SECTION A-A'

PROJECT
PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 5-25-17 | REVISION NO. 0

JOB NO. PTY-001 | FIGURE NO. 10

LEGEND

- SITE PROPERTY BOUNDARY
- STREAM
- SHALLOW MONITORING WELL LOCATION
- DEEP MONITORING WELL LOCATION
- PIEZOMETER LOCATION
- SURFACE WATER SAMPLE LOCATION
- 3 — 1,4-DIOXANE ISOCONTOUR (µg/L) (DASHED WHERE INFERRED)
- (3,300) 1,4-DIOXANE CONCENTRATION (µg/L)

NOTE:

NS = NOT SAMPLED

MW-4 (NS)
MW-9/9A
PZ-1
MW-5 (<3.0)
MW-7A
MW-7B
MW-7C
SW-1
3
100
MW-8 (3,300)
MW-6
MW-1 (<3.0)
MW-3
PZ-2
MW-10/10A
SW-2
SW-4
MW-11/11A
SW-3
PZ-3
ONE STORY BUILDING
ONE STORY BUILDING
MW-2 (<3.0)
CAROLINA & NORTHWESTERN RAILROAD
U.S. HIGHWAY 321
FORBES ROAD
PEARSON'S TURNPIKE

N

APPROXIMATE
0 100 200
SCALE IN FEET

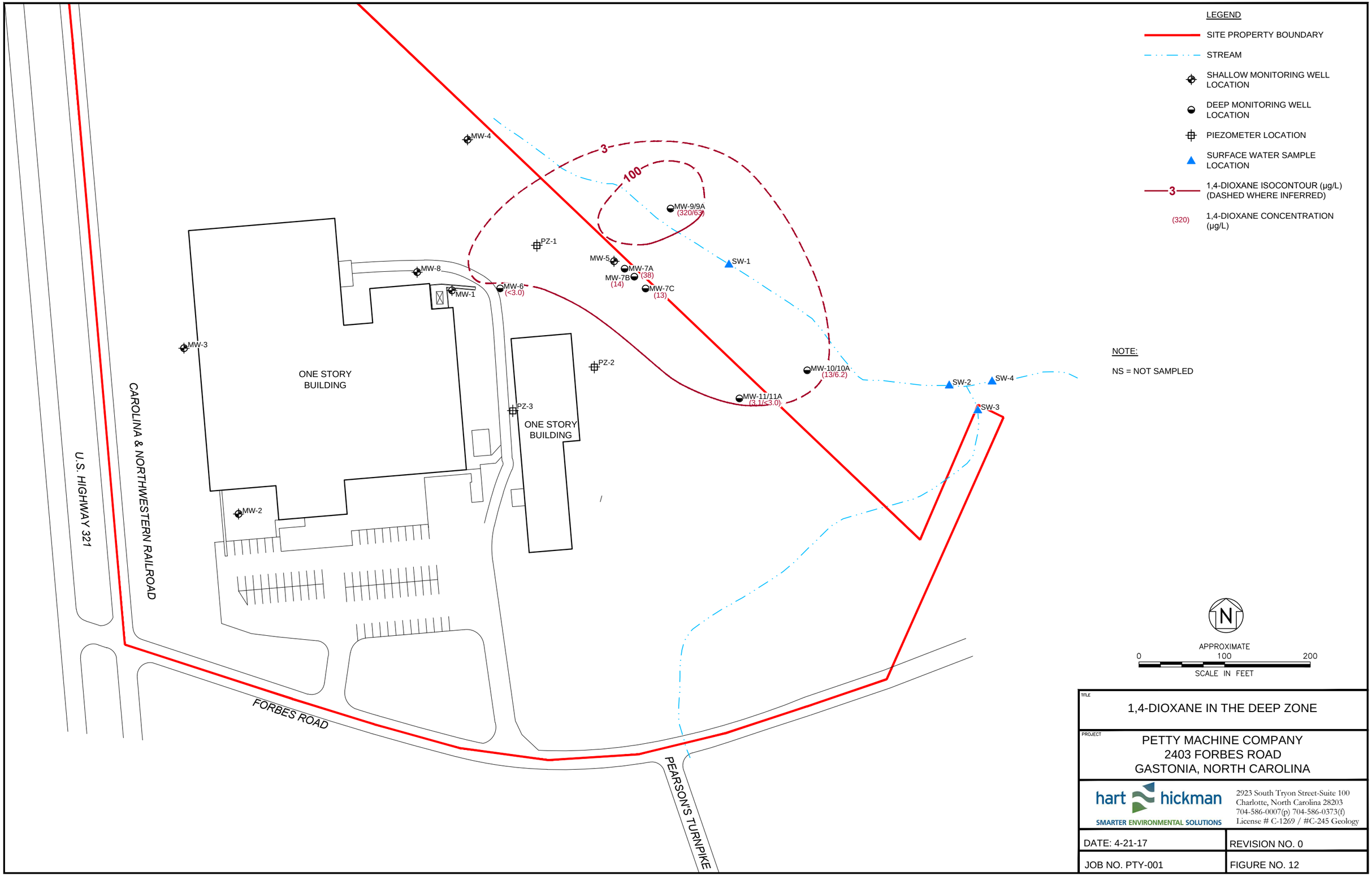
TITLE
1,4-DIOXANE IN THE SHALLOW ZONE

PROJECT
PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-21-17 | REVISION NO. 0
JOB NO. PTY-001 | FIGURE NO. 11

S:\AAA-Master Projects\Petty Machine Company (PTY)\Figures\Figures.dwg, FIG 11, 4/21/2017 9:15:04 AM, zbarlow



TITLE

1,4-DIOXANE IN THE DEEP ZONE

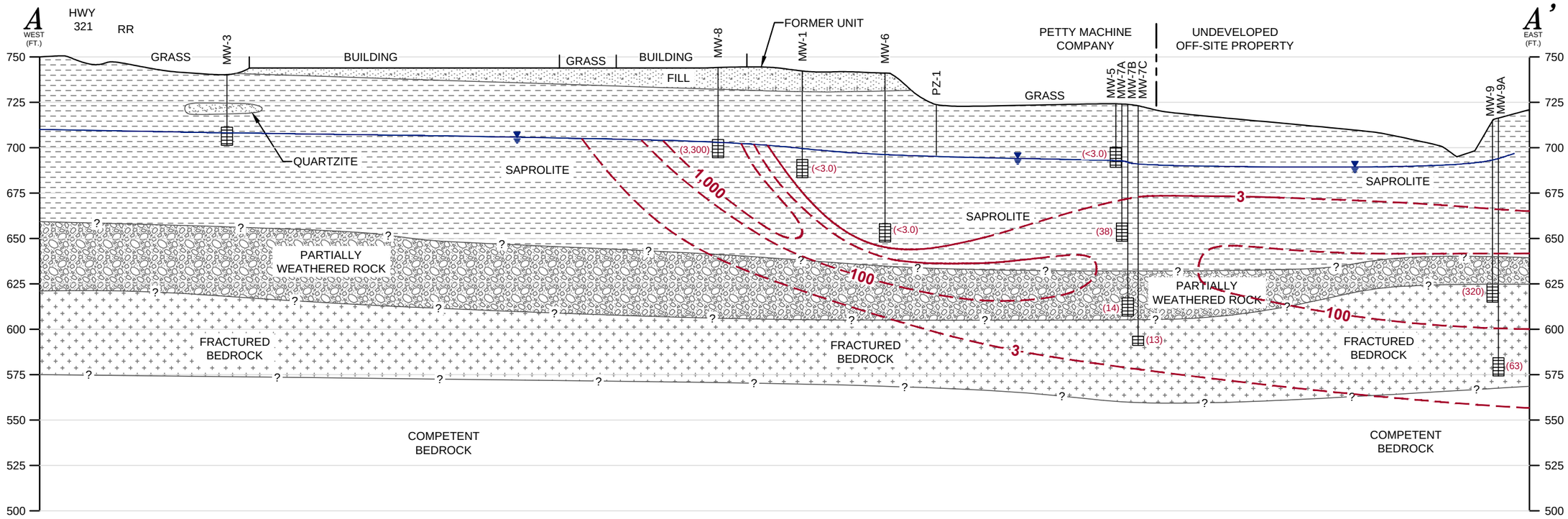
PROJECT

PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-21-17	REVISION NO. 0
JOB NO. PTY-001	FIGURE NO. 12

S:\AAA-Master Projects\Petty Machine Company (PTY)\Figures\Figures.dwg, FIG 12, 4/21/2017 9:14:56 AM, zbarlow



LEGEND

MW-3
MONITORING WELL DEPICTING SCREEN INTERVAL

11/28/16 SHALLOW GROUNDWATER ELEVATION

3 — 1,4-DIOXANE ISOCONTOUR (µg/L) (DASHED WHERE INFERRED)

(38) 1,4-DIOXANE CONCENTRATION (µg/L)

FILL

SAPROLITE

QUARTZITE

PARTIALLY WEATHERED ROCK

FRACTURED BEDROCK

COMPETENT BEDROCK

APPROXIMATE
0 60 120
SCALE IN FEET

NOTE: REFER TO FIGURE 4 OF THIS REPORT FOR CROSS-SECTION TRANSECT.

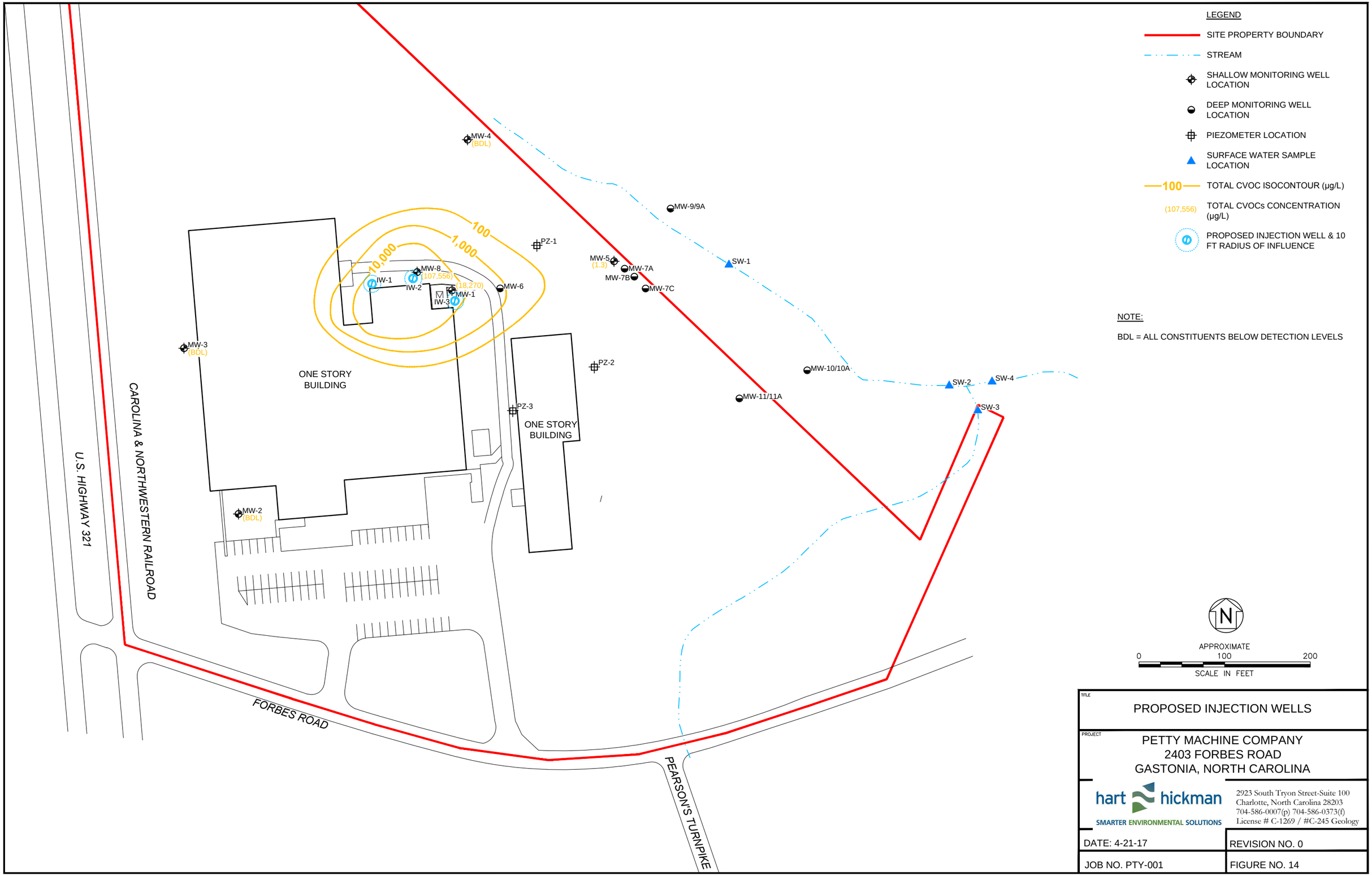
TITLE
1,4-DIOXANE, GEOLOGIC CROSS-SECTION A-A'

PROJECT
PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 5-25-17 | REVISION NO. 0

JOB NO. PTY-001 | FIGURE NO. 13



TITLE

PROPOSED INJECTION WELLS

PROJECT

PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

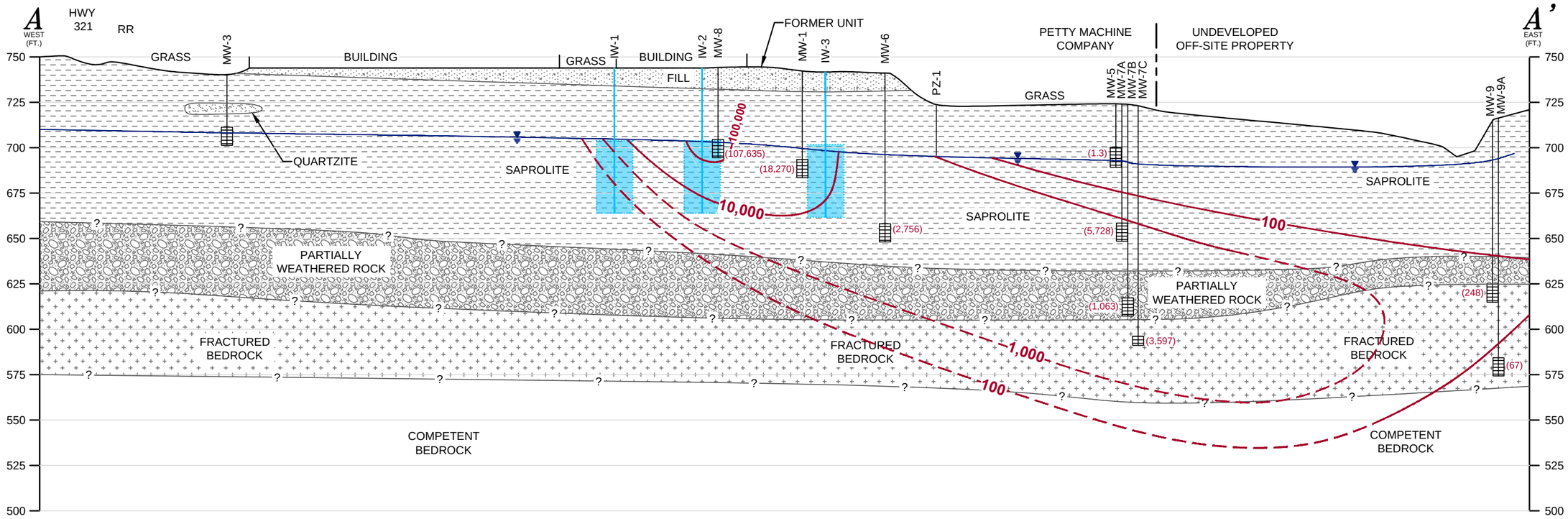
hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-21-17

REVISION NO. 0

JOB NO. PTY-001

FIGURE NO. 14



LEGEND

MW-3
MONITORING WELL DEPICTING SCREEN INTERVAL

IW-3
PROPOSED INJECTION WELL & 10 FT RADIUS OF INFLUENCE

11/28/16 SHALLOW GROUNDWATER ELEVATION

100 TOTAL CVOC ISOCONTOUR (µg/L) (DASHED WHERE INFERRED)

(2,756) TOTAL CVOCs CONCENTRATION (µg/L)

FILL

SAPROLITE

QUARTZITE

PARTIALLY WEATHERED ROCK

FRACTURED BEDROCK

COMPETENT BEDROCK

APPROXIMATE
0 60 120
SCALE IN FEET

NOTE: REFER TO FIGURE 4 OF THIS REPORT FOR CROSS-SECTION TRANSECT.

TITLE
PROPOSED INJECTION WELLS CROSS-SECTION

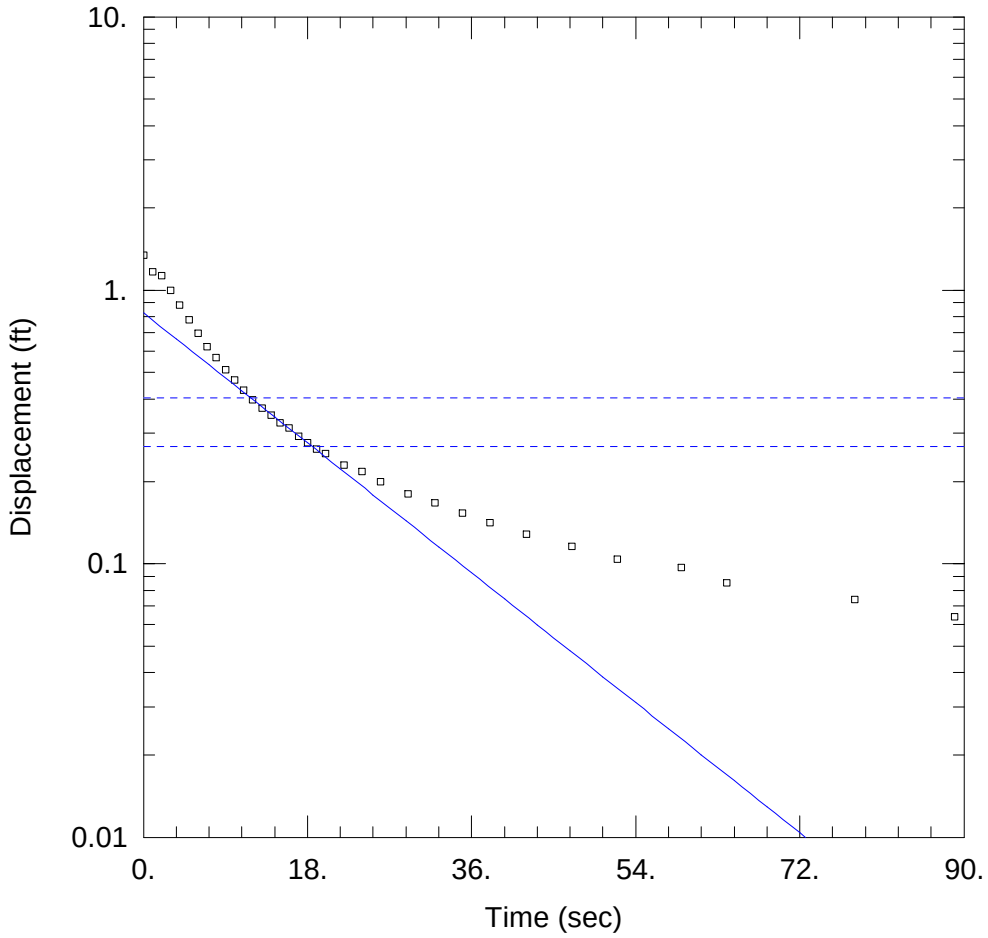
PROJECT
PETTY MACHINE COMPANY
2403 FORBES ROAD
GASTONIA, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 5-25-17 | REVISION NO. 0

JOB NO. PTY-001 | FIGURE NO. 15

Appendix A
Slug Test Information



WELL TEST ANALYSIS

Data Set: T:\...\MW-2_Slug Out.aqt
Date: 09/13/16 Time: 11:52:45

PROJECT INFORMATION

Company: S&ME
Client: Petty Machine Company
Project: 4335-15-109
Location: Petty Machine Company
Test Well: MW-2
Test Date: 8/22/16

AQUIFER DATA

Saturated Thickness: 15.09 ft Anisotropy Ratio (Kz/Kr): 1.

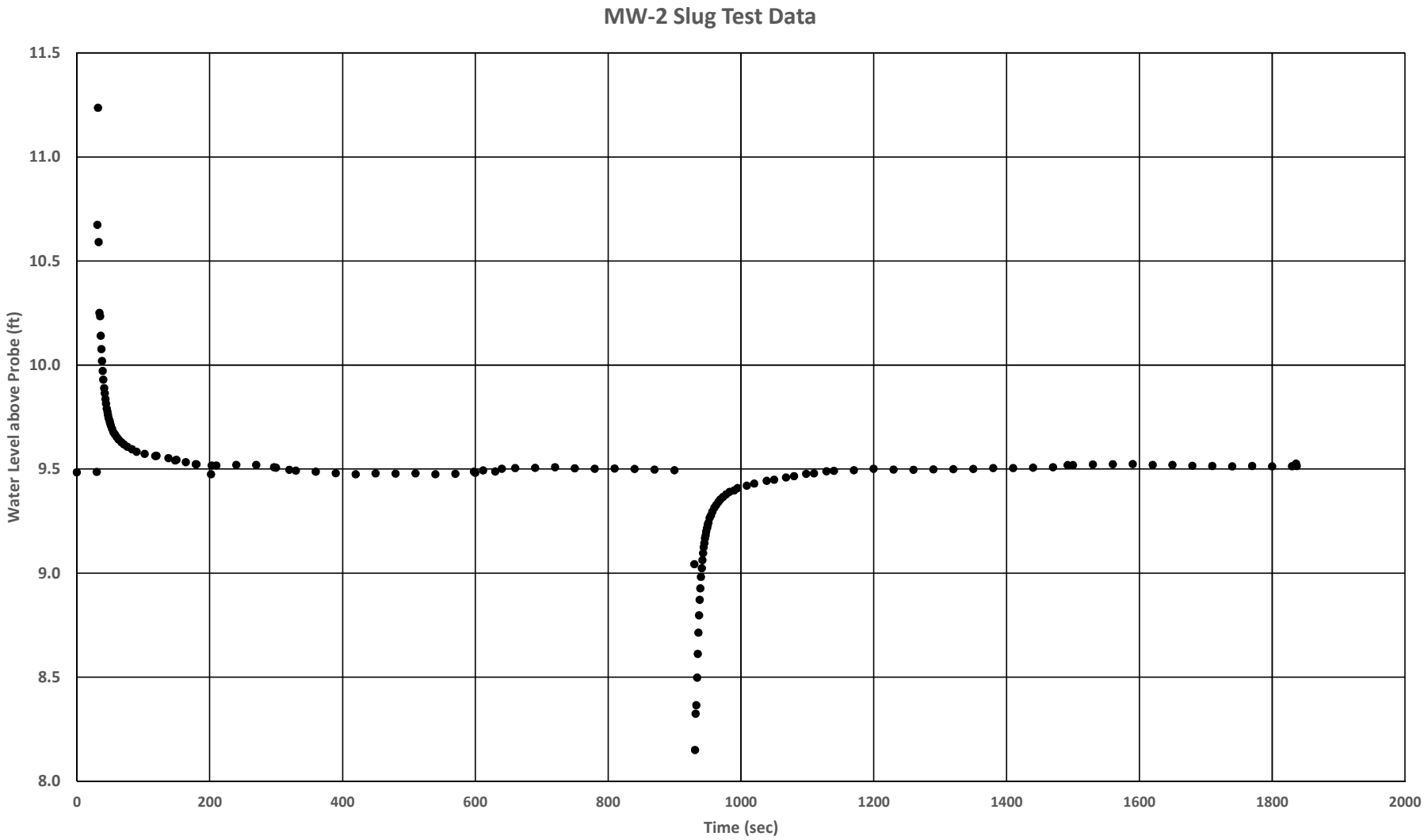
WELL DATA (MW-2)

Initial Displacement: 1.344 ft
Total Well Penetration Depth: 10.09 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 10.09 ft
Screen Length: 10.09 ft
Well Radius: 0.354 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.008686 cm/sec y0 = 0.8261 ft


MW-2 Slug Test Data
Water Level above Probe (ft)
11.5
11.0
10.5
10.0
9.5
9.0
8.5
8.0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
Time (sec)

SLUG TEST DATA FORM (UNCONFINED AQUIFER)

Fill In Data

Automatic Calculations

Project Name/ Address:	**Petty Machine Co / 2403 Forbes Rd, Gastonia, NC**		
S&ME Project Number:	**4335-15-109, Ph 06**		
Monitoring Well ID:	**MW-2**	**Well Installation Date:**	**12/1/1992**
Date of Test:	**8/22/2016**	**Troll 700 Serial Number:**	
Datalogger File Name:	**MW-2_2016-08-22_15-35-34-780.csv**		
Weather/Temperature:	**Hot 90s**		
Field Team Members:	**Scott Y. & Kelsey M.**		
Data Logger Record Method:	**Troll 700 - 360693**		
Well Type :	**Unconfined, Shallow, Regolith**		

(Unconfined/Confined; Shallow/Deep; Regolith/Bedrock)

Method of Slug Test	
Pump	
Bailer	
Artificial Slug	X

Artificial Slug		
Material (Stainless Steel, PVC)	Stainless Steel	
Diameter	ft	0.125
Length	ft	4.50
Base of Aquifer Method:		
Set Depth (blank if not used)	ft-bgs	
Feet below Sandpack	ft	5

Manual DTW-TOCs and Probe readings: Water above probe (WL>Probe) and Temperature	
Time (00:00)	**Manual DTW (ft-TOC) after Probe Inserted ~ stabilized water level**
14:47	27.81

Transducer readings for stabilization check (WinSitu)		
Time (00:00)	**Probe Temp (°C)**	**WL>Probe(ft)**
14:51	19.3	9.48
14:52	19.1	9.48

Slug Test - Initial Data	**Time (00:00)**	**WL>Probe (ft)**	**Initial Change (ft)**	**WL @ 95% Recovery (ft)**	**WL @ 60% Recovery (ft)**
Slug-In Test #1:	15:04	9.484	1.105	9.539	9.926
Slug-Out Test #1:	15:19	9.494	1.344	9.427	8.956
Slug-In Test #2:			0.000	0.000	0.000
Slug-Out Test #2:			0.000	0.000	0.000

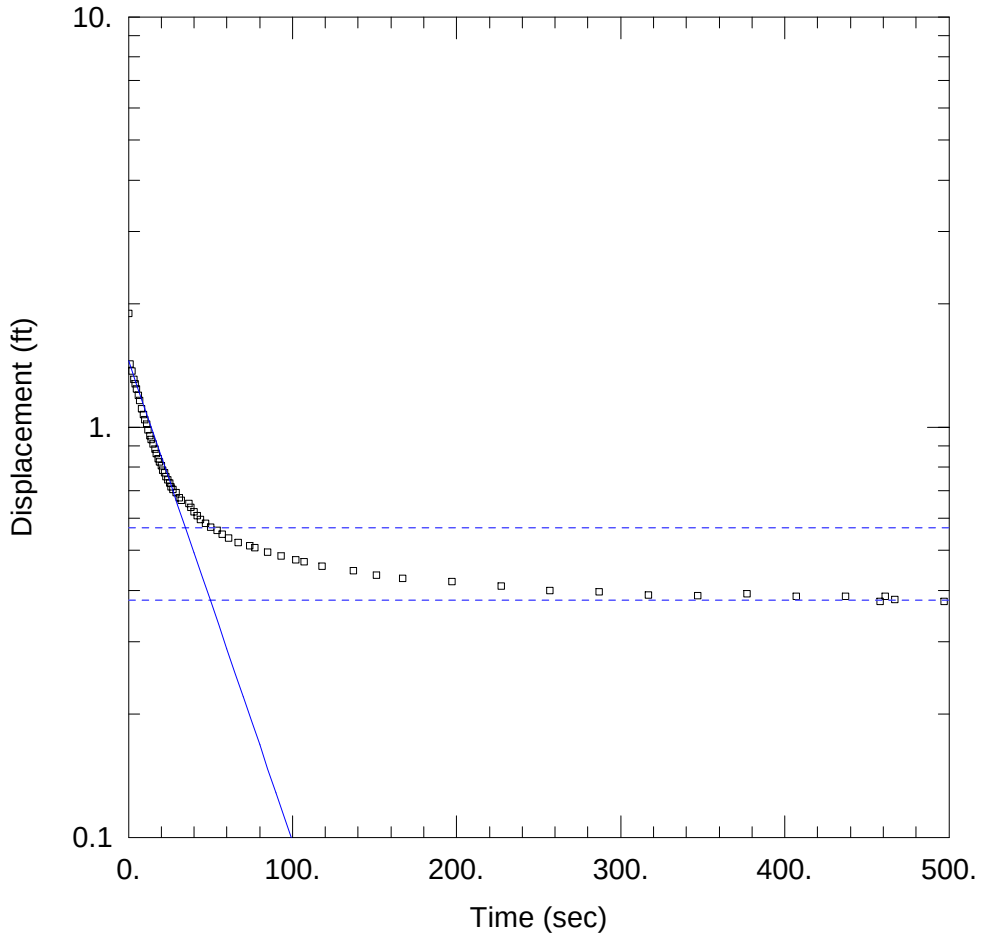
Comments (unusual conditions, etc.):

Well Data		
Description	**Value**	**Unit**
Well Stickup	-0.25	ft-ags
Ground Surface Elevation	0.00	ft
Well Log Data		
Open Hole/Well Diameter (inner)	2.00	in
Borehole Diameter (Screen Zone)	8.50	in
Top of Bentonite Seal	24.50	ft-bgs
Top of Sandpack	26.50	ft-bgs
Top of Well Screen	28.50	ft-bgs
Base of Well Screen	38.50	ft-bgs
Bottom Well Sump below Screen	0.00	ft
Base of Boring (Sand Pack)	38.50	ft-bgs
Screen Length	10.00	ft-bgs
Measured Depths		
DTW Time Measured	14:31	
Measured Depth to Water	27.81	ft-toc
Measured Total Well Depth	37.90	ft-toc
Calculated from Measured Depths		
Top of Sandpack	26.15	ft-bgs
Top of Well Screen	28.15	ft-bgs
Depth to Water	28.06	ft-bgs
Sand pack above screen	2.00	ft
Sand pack below screen	0.00	ft
Base of Well Screen	38.15	ft-bgs
Base of Sand Pack/Boring	38.15	ft-bgs

AQTESOLV Data			
Description	**Value**	**Unit**	**Variable**
Water Level above Sandpack?	-1.91	ft	
No			
Initial Displacement - Slug In	1.105	ft	H(0)
Initial Displacement - Slug Out	1.344	ft	H(0)
Static Water Column Height	10.09	ft	H
* Above base of sand pack			
Saturated Aquifer Thickness	15.09	ft	b
Aquifer Anisotropy	1.00	unitless	Kv/Kh
Depth to Top of Well Screen (<WL)	0.00	ft	d
* includes sandpack above screen			
Screen Length (inc. sandpack)	10.09	ft	L
Total Penetration Depth	10.09	ft	d+L
Transducer Depth (Slug In)	9.484	ft	T
Transducer Depth (Slug Out)	9.494	ft	T
* Water above probe			
Inside Radius of Well Casing	0.0833	ft	r(c)
Radius of Downhole Equipment	0.000	ft	r(eq)
Inside Radius of Packer	0.000	ft	r(p)
Radius of Well (borehole)	0.354	ft	r(w)
Outer Radius of Well (well skin)	0.354	ft	r(sk)
Effective Casing Radius			
Sand Pack Effective Porosity	0.30	unitless	n(e)
Kinematic Viscosity	1.20E-06	m^2/sec	
Gravitational acceleration	9.81	m/sec^2	

Signatures: **Date:**

Revision Date: 8/16/2016



WELL TEST ANALYSIS

Data Set: T:\...\MW-5_Slug Out.aqt
Date: 09/13/16 Time: 12:23:46

PROJECT INFORMATION

Company: S&ME
Client: Petty Machine Company
Project: 4335-15-109
Location: Petty Machine Company
Test Well: MW-5
Test Date: 8/22/16

AQUIFER DATA

Saturated Thickness: 15.13 ft Anisotropy Ratio (Kz/Kr): 1.

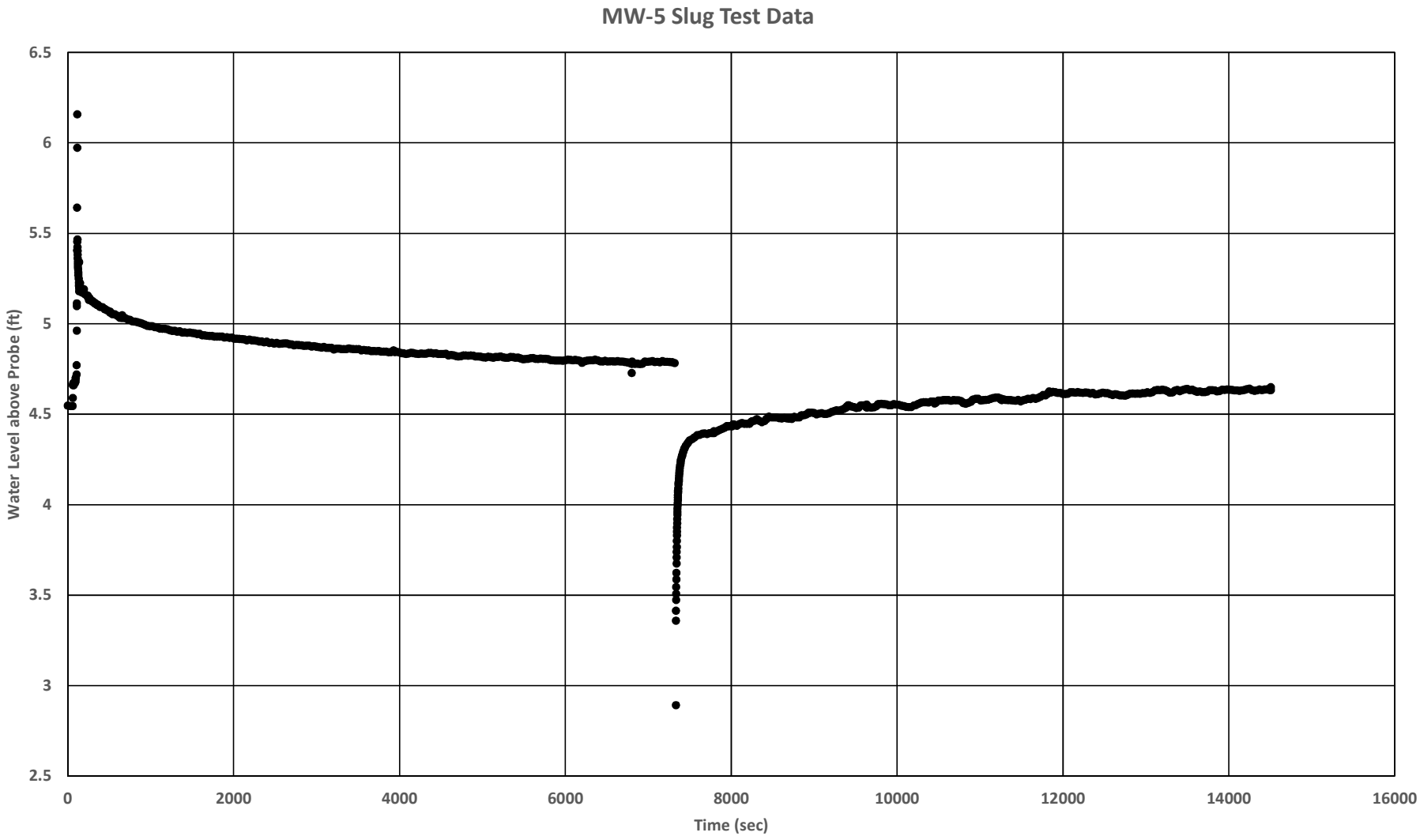
WELL DATA (MW-5)

Initial Displacement: 1.891 ft
Total Well Penetration Depth: 5.13 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 5.13 ft
Screen Length: 5.13 ft
Well Radius: 0.354 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0055 cm/sec y0 = 1.452 ft


MW-5 Slug Test Data
Water Level above Probe (ft)
6.5
6
5.5
5
4.5
4
3.5
3
2.5
0
2000
4000
6000
8000
10000
12000
14000
16000
Time (sec)

SLUG TEST DATA FORM (UNCONFINED AQUIFER)

Fill In Data

Automatic Calculations

S&ME

Project Name/ Address:	**Petty Machine Co / 2403 Forbes Rd, Gastonia, NC**		
S&ME Project Number:	**4335-15-109, Ph 06**		
Monitoring Well ID:	**MW-5**	**Well Installation Date:**	**2/2/1993**
Date of Test:	**8/22/2016**	**Troll 700 Serial Number:**	
Datalogger File Name:	**MW-5_2016-08-22_14-21-19-128.csv**		
Weather/Temperature:	**Hot 90s**		
Field Team Members:	**Scott Y. & Kelsey M.**		
Data Logger Record Method:	**Troll 700 - 360693**		
Well Type :	**Unconfined, Shallow, Regolith**		

(Unconfined/Confined; Shallow/Deep; Regolith/Bedrock)

Method of Slug Test	
Pump	
Bailer	
Artificial Slug	X

Artificial Slug		
Material (Stainless Steel, PVC)	Stainless Steel	
Diameter	ft	0.122
Length	ft	2.50
Base of Aquifer Method:		
Set Depth (blank if not used)	ft-bgs	
Feet below Sandpack	ft	10

Manual DTW-TOCs and Probe readings: Water above probe (WL>Probe) and Temperature	
Time (00:00)	**Manual DTW (ft-TOC) after Probe Inserted ~ stabilized water level**
09:46	30.81
09:56	30.82
10:08	30.83
10:17	30.84

Transducer readings for stabilization check (WinSitu)		
Time (00:00)	**Probe Temp (°C)**	**WL>Probe(ft)**
09:41	24.6	5.56
09:51	16.0	4.56
10:03	15.6	4.56
10:07	15.6	4.54

Slug Test - Initial Data	**Time (00:00)**	**WL>Probe (ft)**	**Initial Change (ft)**	**WL @ 95% Recovery (ft)**	**WL @ 60% Recovery (ft)**
Slug-In Test #1:	10:20	4.545	1.612	4.626	5.190
Slug-Out Test #1:	12:20	4.782	1.891	4.687	4.026
Slug-In Test #2:			0.000	0.000	0.000
Slug-Out Test #2:			0.000	0.000	0.000

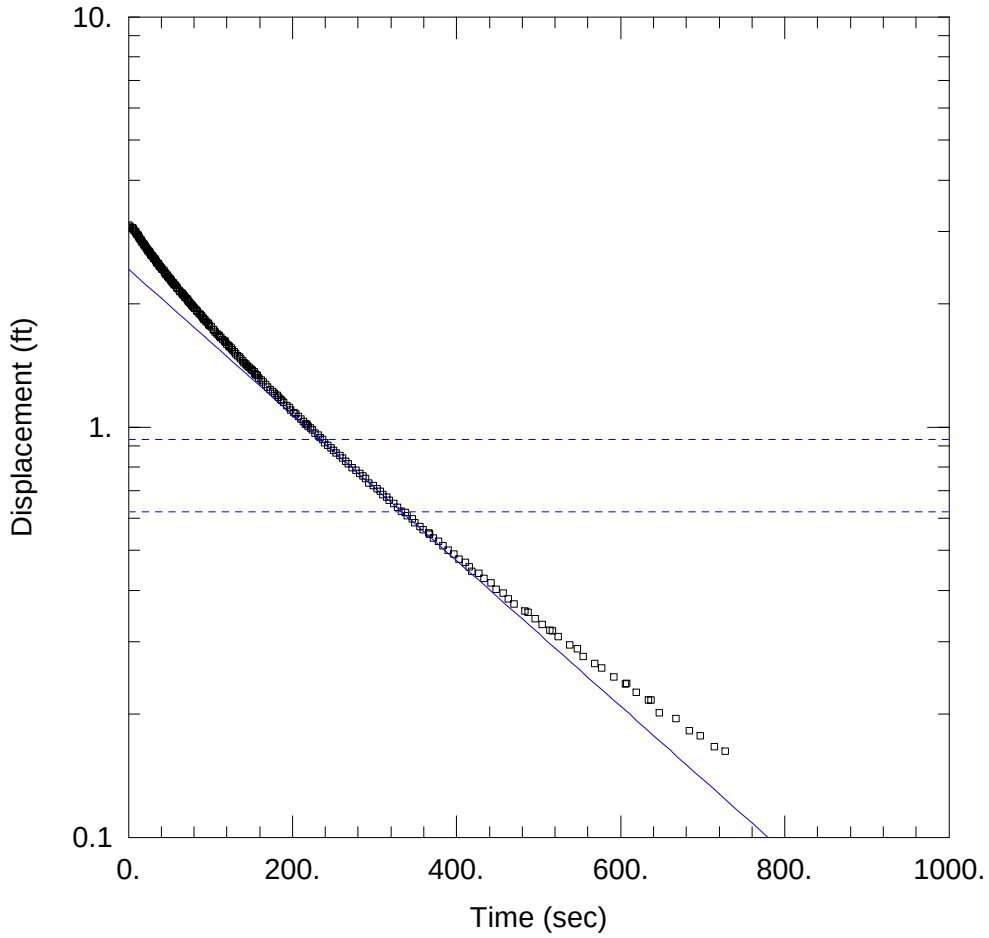
Comments (unusual conditions, etc.):

Well Data		
Description	**Value**	**Unit**
Well Stickup	2.00	ft-ags
Ground Surface Elevation	0.00	ft
Well Log Data		
Open Hole/Well Diameter (inner)	2.00	in
Borehole Diameter (Screen Zone)	8.50	in
Top of Bentonite Seal	29.00	ft-bgs
Top of Sandpack	31.00	ft-bgs
Top of Well Screen	32.50	ft-bgs
Base of Well Screen	42.50	ft-bgs
Bottom Well Sump below Screen	0.00	ft
Base of Boring (Sand Pack)	42.50	ft-bgs
Screen Length	10.00	ft-bgs
Measured Depths		
DTW Time Measured	09:22	
Measured Depth to Water	30.84	ft-toc
Measured Total Well Depth	35.97	ft-toc
Calculated from Measured Depths		
Top of Sandpack	22.47	ft-bgs
Top of Well Screen	23.97	ft-bgs
Depth to Water	28.84	ft-bgs
Sand pack above screen	1.50	ft
Sand pack below screen	0.00	ft
Base of Well Screen	33.97	ft-bgs
Base of Sand Pack/Boring	33.97	ft-bgs

AQTESOLV Data			
Description	**Value**	**Unit**	**Variable**
Water Level above Sandpack?	-6.37	ft	
No			
Initial Displacement - Slug In	1.612	ft	H(0)
Initial Displacement - Slug Out	1.891	ft	H(0)
Static Water Column Height	5.13	ft	H
* Above base of sand pack			
Saturated Aquifer Thickness	15.13	ft	b
Aquifer Anisotropy	1.00	unitless	Kv/Kh
Depth to Top of Well Screen (<WL)	0.00	ft	d
* includes sandpack above screen			
Screen Length (inc. sandpack)	5.13	ft	L
Total Penetration Depth	5.13	ft	d+L
Transducer Depth (Slug In)	4.545	ft	T
Transducer Depth (Slug Out)	4.782	ft	T
* Water above probe			
Inside Radius of Well Casing	0.0833	ft	r(c)
Radius of Downhole Equipment	0.000	ft	r(eq)
Inside Radius of Packer	0.000	ft	r(p)
Radius of Well (borehole)	0.354	ft	r(w)
Outer Radius of Well (well skin)	0.354	ft	r(sk)
Effective Casing Radius			
Sand Pack Effective Porosity	0.30	unitless	n(e)
Kinematic Viscosity	1.20E-06	m^2/sec	
Gravitational acceleration	9.81	m/sec^2	

Signatures: **Date:**

Revision Date: 8/16/2016



WELL TEST ANALYSIS

Data Set: T:\...\MW-7A_Slug In.aqt
Date: 09/13/16 Time: 12:32:07

PROJECT INFORMATION

Company: S&ME
Client: Petty Machine Company
Project: 4335-15-109
Location: Petty Machine Company
Test Well: MW-7A
Test Date: 8/19/16

AQUIFER DATA

Saturated Thickness: 57.12 ft Anisotropy Ratio (Kz/Kr): 1.

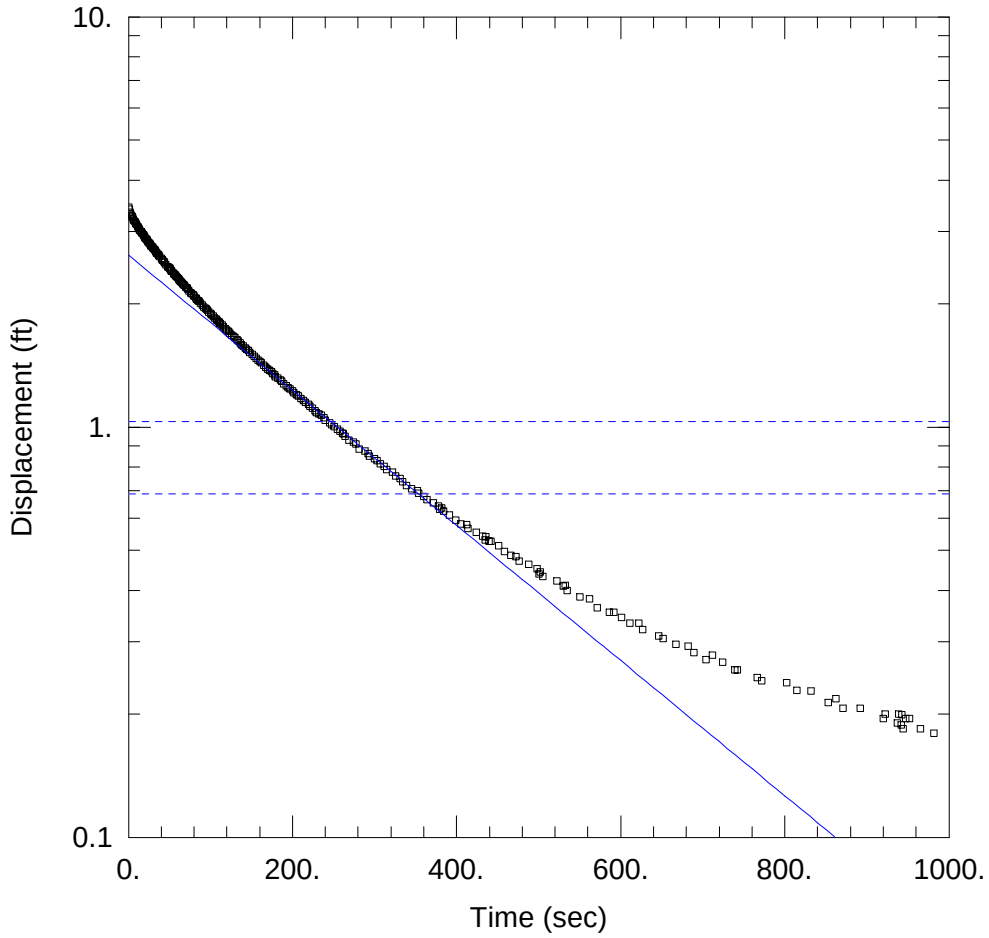
WELL DATA (MW-7A)

Initial Displacement: 3.106 ft
Total Well Penetration Depth: 47.12 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 47.12 ft
Screen Length: 12. ft
Well Radius: 0.438 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.000888 cm/sec y0 = 2.426 ft



WELL TEST ANALYSIS

Data Set: T:\...\MW-7A_Slug Out.aqt
Date: 09/13/16 Time: 12:31:59

PROJECT INFORMATION

Company: S&ME
Client: Petty Machine Company
Project: 4335-15-109
Location: Petty Machine Company
Test Well: MW-7A
Test Date: 8/19/16

AQUIFER DATA

Saturated Thickness: 57.12 ft Anisotropy Ratio (Kz/Kr): 1.

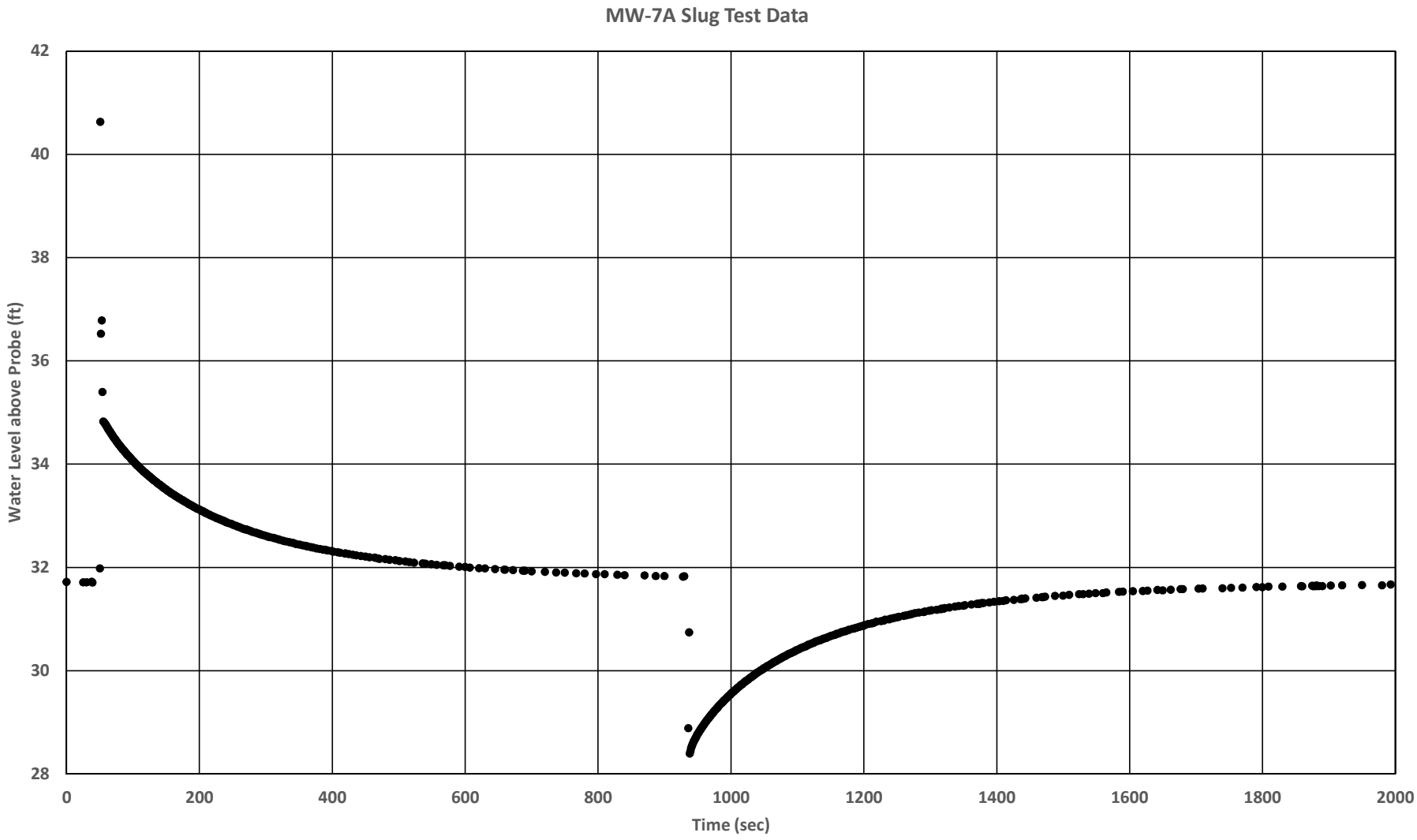
WELL DATA (MW-7A)

Initial Displacement: 3.439 ft
Total Well Penetration Depth: 47.12 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 47.12 ft
Screen Length: 12. ft
Well Radius: 0.438 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0008234 cm/sec y0 = 2.624 ft


MW-7A Slug Test Data
Water Level above Probe (ft)
42
40
38
36
34
32
30
28
0
200
400
600
800
1000
1200
1400
1600
1800
2000
Time (sec)

SLUG TEST DATA FORM (UNCONFINED AQUIFER)

Fill In Data

Automatic Calculations

S&ME

Project Name/ Address:	**Petty Machine Co / 2403 Forbes Rd, Gastonia, NC**		
S&ME Project Number:	**4335-15-109, Ph 06**		
Monitoring Well ID:	**MW-7A**	**Well Installation Date:**	**2/2/1993**
Date of Test:	**8/19/2016**	**Troll 700 Serial Number:**	
Datalogger File Name:	**MW-71_2016-08-19_12-18-26-073.csv**		
Weather/Temperature:	**Hot/90s**		
Field Team Members:	**Travis O. & Kelsey M.**		
Data Logger Record Method:	**Troll 700 - 360693**		
Well Type :	**Unconfined, Shallow, Regolith**		

(Unconfined/Confined; Shallow/Deep; Regolith/Bedrock)

Method of Slug Test		
Pump		
Bailer		
Artificial Slug	X	

Artificial Slug		
Material (Stainless Steel, PVC)	Stainless Steel	
Diameter	ft	0.125
Length	ft	4.50
Base of Aquifer Method:		
Set Depth (blank if not used)	ft-bgs	
Feet below Sandpack	ft	10

Manual DTW-TOCs and Probe readings: Water above probe (WL>Probe) and Temperature	
Time (00:00)	**Manual DTW (ft-TOC) after Probe Inserted ~ stabilized water level**
11:01	30.44
11:04	30.58
11:10	30.70
11:18	30.74

Transducer readings for stabilization check (WinSitu)		
Time (00:00)	**Probe Temp (°C)**	**WL>Probe(ft)**
11:02	16.6	32.02
11:11	15.9	31.72
11:16	15.8	31.71

Slug Test - Initial Data	**Time (00:00)**	**WL>Probe (ft)**	**Initial Change (ft)**	**WL @ 95% Recovery (ft)**	**WL @ 60% Recovery (ft)**
Slug-In Test #1:	11:19	31.718	3.106	31.873	32.960
Slug-Out Test #1:	11:34	31.813	3.439	31.641	30.437
Slug-In Test #2:			0.000	0.000	0.000
Slug-Out Test #2:			0.000	0.000	0.000

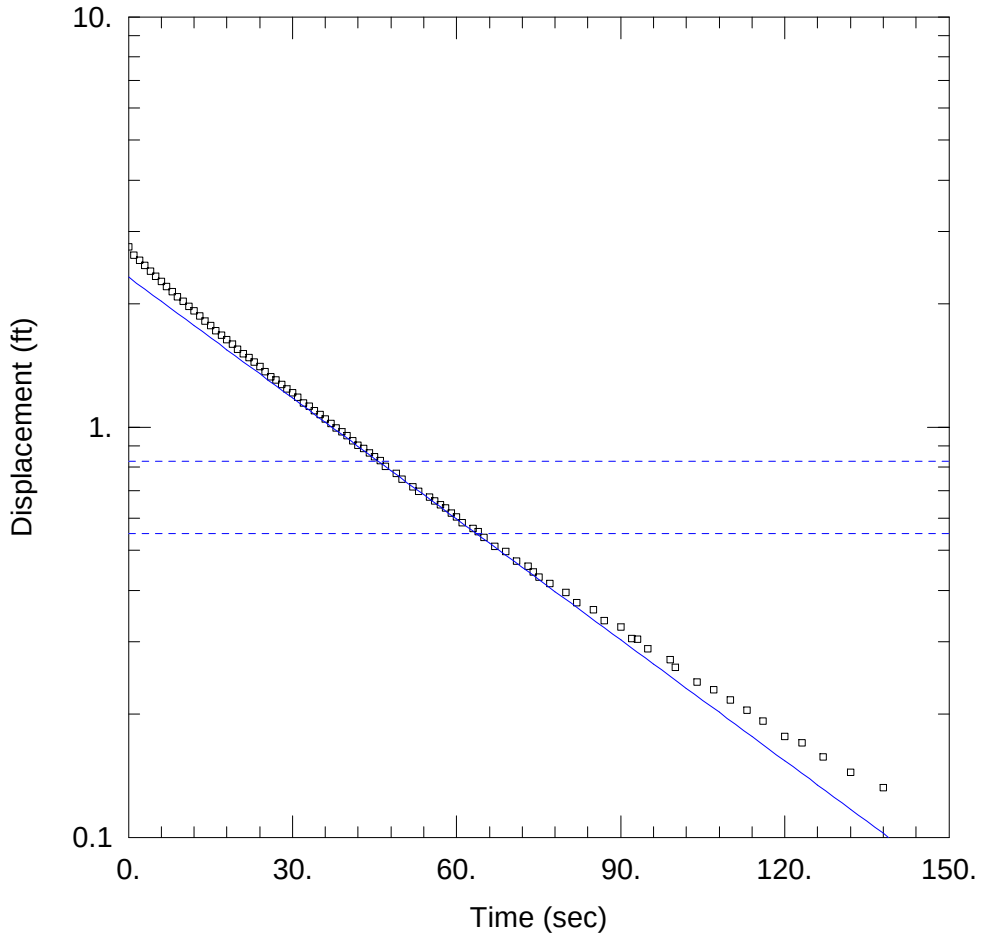
Comments (unusual conditions, etc.):

Well Data		
Description	**Value**	**Unit**
Well Stickup	2.30	ft-ags
Ground Surface Elevation	0.00	ft
Well Log Data		
Open Hole/Well Diameter (inner)	2.00	in
Borehole Diameter (Screen Zone)	10.50	in
Top of Bentonite Seal	61.56	ft-bgs
Top of Sandpack	63.56	ft-bgs
Top of Well Screen	65.56	ft-bgs
Base of Well Screen	75.56	ft-bgs
Bottom Well Sump below Screen	0.00	ft
Base of Boring (Sand Pack)	75.56	ft-bgs
Screen Length	10.00	ft-bgs
Measured Depths		
DTW Time Measured	10:23	
Measured Depth to Water	30.74	ft-toc
Measured Total Well Depth	77.86	ft-toc
Calculated from Measured Depths		
Top of Sandpack	63.56	ft-bgs
Top of Well Screen	65.56	ft-bgs
Depth to Water	28.44	ft-bgs
Sand pack above screen	2.00	ft
Sand pack below screen	0.00	ft
Base of Well Screen	75.56	ft-bgs
Base of Sand Pack/Boring	75.56	ft-bgs

AQTESOLV Data			
Description	**Value**	**Unit**	**Variable**
Water Level above Sandpack?	35.12	ft	
Yes			
Initial Displacement - Slug In	3.106	ft	H(0)
Initial Displacement - Slug Out	3.439	ft	H(0)
Static Water Column Height	47.12	ft	H
* Above base of sand pack			
Saturated Aquifer Thickness	57.12	ft	b
Aquifer Anisotropy	1.00	unitless	Kv/Kh
Depth to Top of Well Screen (<WL)	35.12	ft	d
* includes sandpack above screen			
Screen Length (inc. sandpack)	12.00	ft	L
Total Penetration Depth	47.12	ft	d+L
Transducer Depth (Slug In)	31.718	ft	T
Transducer Depth (Slug Out)	31.813	ft	T
* Water above probe			
Inside Radius of Well Casing	0.0833	ft	r(c)
Radius of Downhole Equipment	0.000	ft	r(eq)
Inside Radius of Packer	0.000	ft	r(p)
Radius of Well (borehole)	0.438	ft	r(w)
Outer Radius of Well (well skin)	0.438	ft	r(sk)
Effective Casing Radius			
Sand Pack Effective Porosity	0.30	unitless	n(e)
Kinematic Viscosity	1.20E-06	m^2/sec	
Gravitational acceleration	9.81	m/sec^2	

Signatures: **Date:**

Revision Date: 8/16/2016



WELL TEST ANALYSIS

Data Set: T:\...\MW-7B_Slug In.aqt
Date: 09/13/16 Time: 12:45:21

PROJECT INFORMATION

Company: S&ME
Client: Petty Machine Company
Project: 4335-15-109
Location: Petty Machine Company
Test Well: MW-7B
Test Date: 8/19/16

AQUIFER DATA

Saturated Thickness: 97.63 ft Anisotropy Ratio (Kz/Kr): 1.

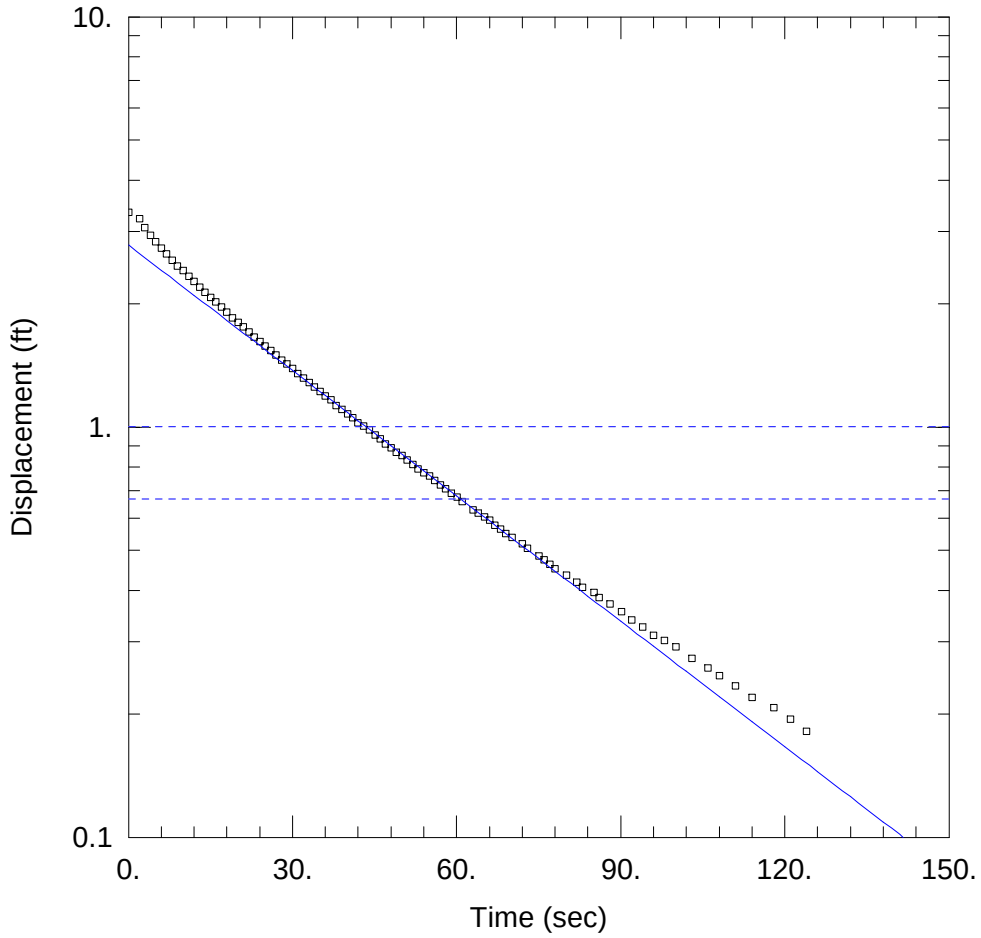
WELL DATA (MW-7B)

Initial Displacement: 2.753 ft
Total Well Penetration Depth: 87.63 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 87.63 ft
Screen Length: 12. ft
Well Radius: 0.438 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00531 cm/sec y0 = 2.319 ft



WELL TEST ANALYSIS

Data Set: T:\...\MW-7B_Slug Out.aqt
Date: 09/13/16 Time: 12:43:14

PROJECT INFORMATION

Company: S&ME
Client: Petty Machine Company
Project: 4335-15-109
Location: Petty Machine Company
Test Well: MW-7B
Test Date: 8/19/16

AQUIFER DATA

Saturated Thickness: 97.63 ft Anisotropy Ratio (Kz/Kr): 1.

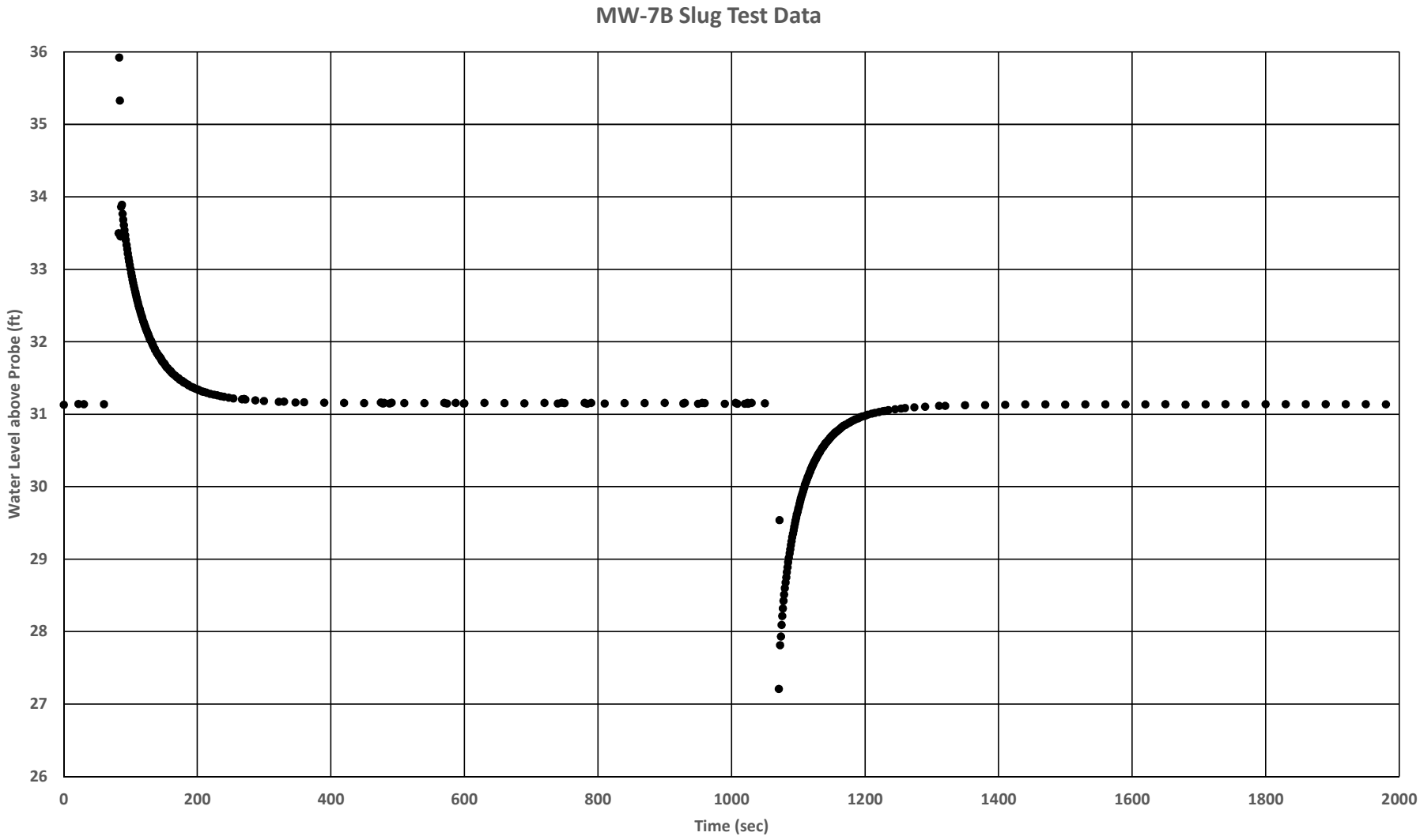
WELL DATA (MW-7B)

Initial Displacement: 3.343 ft
Total Well Penetration Depth: 87.63 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 87.63 ft
Screen Length: 12. ft
Well Radius: 0.438 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.005507 cm/sec y0 = 2.775 ft


MW-7B Slug Test Data
Water Level above Probe (ft)
36
35
34
33
32
31
30
29
28
27
26
0
200
400
600
800
1000
1200
1400
1600
1800
2000
Time (sec)

SLUG TEST DATA FORM (UNCONFINED AQUIFER)

Fill In Data

Automatic Calculations

Project Name/ Address:	**Petty Machine Co / 2403 Forbes Rd, Gastonia, NC**		
S&ME Project Number:	**4335-15-109, Ph 06**		
Monitoring Well ID:	**MW-7B**	**Well Installation Date:**	**2/2/1993**
Date of Test:	**8/19/2016**	**Troll 700 Serial Number:**	
Datalogger File Name:	**MW-7B_2016-08-18_15-27-19-138.csv**		
Weather/Temperature:	**Sunny 90's**		
Field Team Members:	**Travis O. & Kelsey M.**		
Data Logger Record Method:	**Troll 700 - 360693**		
Well Type :	**Unconfined, Shallow, Regolith**		
	(Unconfined/Confined; Shallow/Deep; Regolith/Bedrock)		

Method of Slug Test	
Pump	
Bailer	
Artificial Slug	X

Artificial Slug		
Material (Stainless Steel, PVC)	Stainless Steel	
Diameter	ft	0.125
Length	ft	4.50
Base of Aquifer Method:		
Set Depth (blank if not used)	ft-bgs	
Feet below Sandpack	ft	10

Slug Test - Initial Data	Time (00:00)	WL>Probe (ft)
Slug-In Test #1:	10:18	31.137
Slug-Out Test #1:	10:35	31.150
Slug-In Test #2:		
Slug-Out Test #2:		

Comments (unusual conditions, etc.):

Manual DTW-TOCs and Probe readings: Water above probe (WL>Probe) and Temperature

Time (00:00)	Manual DTW (ft-TOC) after Probe Inserted ~ stabilized water level
10:08	31.20
10:10	31.36

Transducer readings for stabilization check (WinSitu)

Time (00:00)	Probe Temp (°C)	WL>Probe(ft)
10:14	16.0	31.12
10:16	15.9	31.12

Initial Change (ft)	WL @ 95% Recovery (ft)	WL @ 60% Recovery (ft)
2.753	31.275	32.238
3.343	30.983	29.813
0.000	0.000	0.000
0.000	0.000	0.000

Well Data

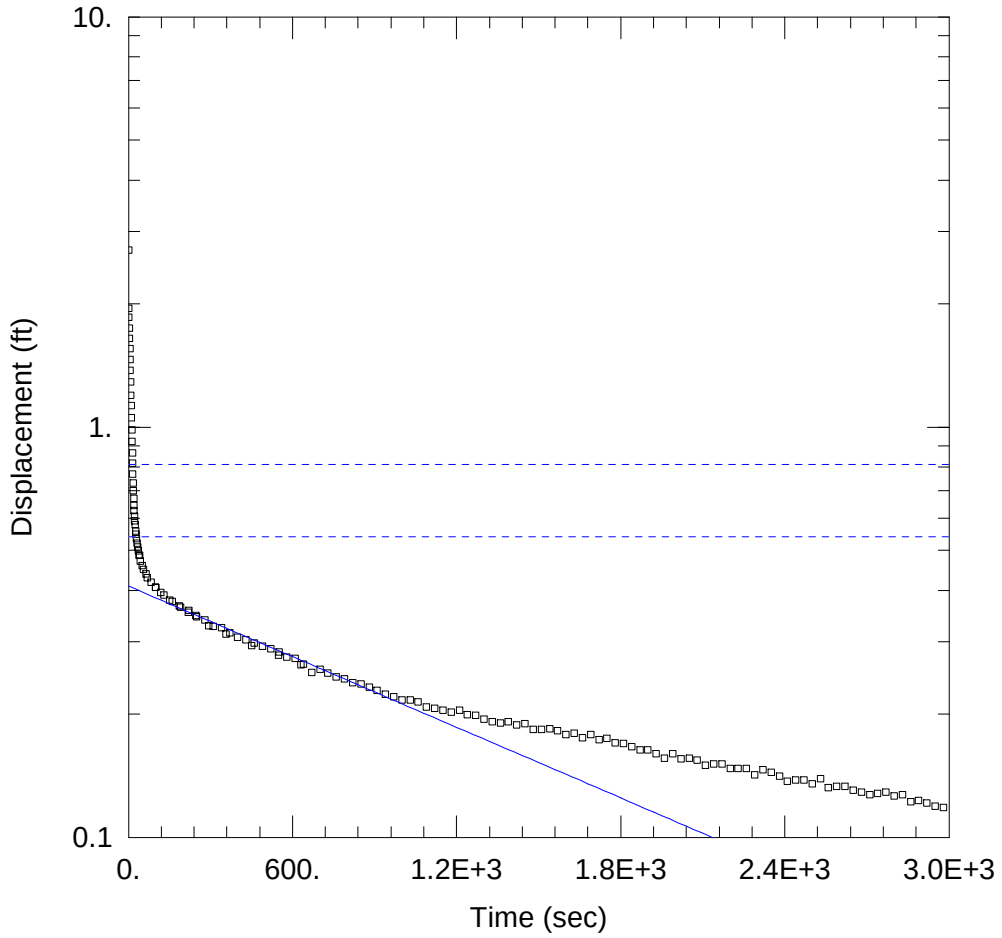
Description	Value	Unit
Well Stickup	2.40	ft-ags
Ground Surface Elevation	0.00	ft
Well Log Data		
Open Hole/Well Diameter (inner)	2.00	in
Borehole Diameter (Screen Zone)	10.50	in
Top of Bentonite Seal	102.59	ft-bgs
Top of Sandpack	104.59	ft-bgs
Top of Well Screen	106.59	ft-bgs
Base of Well Screen	116.59	ft-bgs
Bottom Well Sump below Screen	0.00	ft
Base of Boring (Sand Pack)	116.59	ft-bgs
Screen Length	10.00	ft-bgs
Measured Depths		
DTW Time Measured	09:28	
Measured Depth to Water	31.36	ft-toc
Measured Total Well Depth	118.99	ft-toc
Calculated from Measured Depths		
Top of Sandpack	104.59	ft-bgs
Top of Well Screen	106.59	ft-bgs
Depth to Water	28.96	ft-bgs
Sand pack above screen	2.00	ft
Sand pack below screen	0.00	ft
Base of Well Screen	116.59	ft-bgs
Base of Sand Pack/Boring	116.59	ft-bgs

AQTESOLV Data

Description	Value	Unit	Variable
Water Level above Sandpack?	75.63	ft	
Yes			
Initial Displacement - Slug In	2.753	ft	H(0)
Initial Displacement - Slug Out	3.343	ft	H(0)
Static Water Column Height	87.63	ft	H
* Above base of sand pack			
Saturated Aquifer Thickness	97.63	ft	b
Aquifer Anisotropy	1.00	unitless	Kv/Kh
Depth to Top of Well Screen (<WL)	75.63	ft	d
* includes sandpack above screen			
Screen Length (inc. sandpack)	12.00	ft	L
Total Penetration Depth	87.63	ft	d+L
Transducer Depth (Slug In)	31.137	ft	T
Transducer Depth (Slug Out)	31.150	ft	T
* Water above probe			
Inside Radius of Well Casing	0.0833	ft	r(c)
Radius of Downhole Equipment	0.000	ft	r(eq)
Inside Radius of Packer	0.000	ft	r(p)
Radius of Well (borehole)	0.438	ft	r(w)
Outer Radius of Well (well skin)	0.438	ft	r(sk)
Effective Casing Radius			
Sand Pack Effective Porosity	0.30	unitless	n(e)
Kinematic Viscosity	1.20E-06	m^2/sec	
Gravitational acceleration	9.81	m/sec^2	

Signatures: **Date:**

Revision Date: 8/16/2016



WELL TEST ANALYSIS

Data Set: T:\...\MW-8_Slug Out.aqt
Date: 09/13/16 Time: 13:15:48

PROJECT INFORMATION

Company: S&ME
Client: Petty Machine Company
Project: 4335-15-109
Location: Petty Machine Company
Test Well: MW-8
Test Date: 8/19/16

AQUIFER DATA

Saturated Thickness: 14.4 ft Anisotropy Ratio (Kz/Kr): 1.

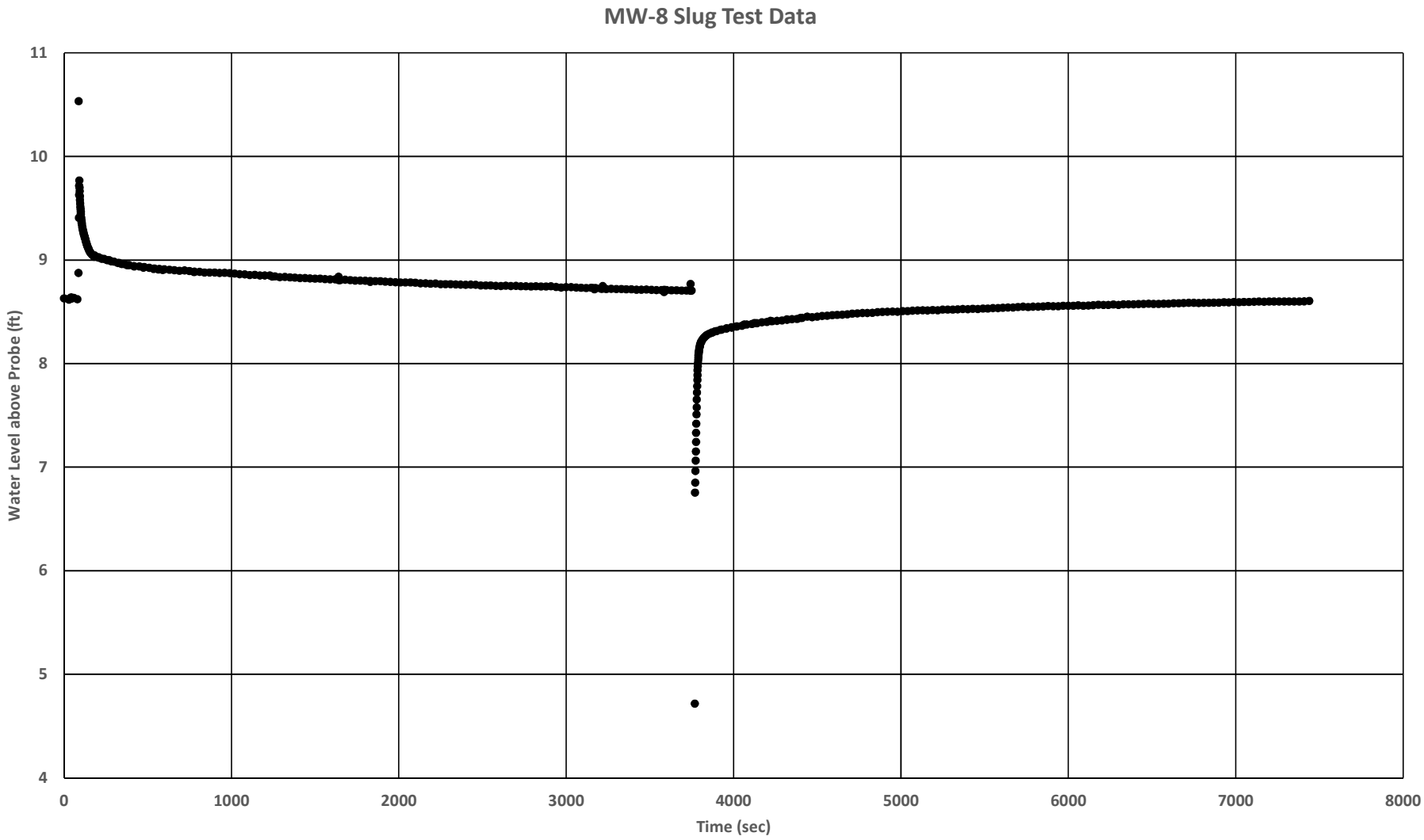
WELL DATA (MW-8)

Initial Displacement: 2.699 ft
Total Well Penetration Depth: 9.4 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 9.4 ft
Screen Length: 9.4 ft
Well Radius: 0.354 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 9.859E-5 cm/sec y0 = 0.4096 ft


MW-8 Slug Test Data
Water Level above Probe (ft)
11
10
9
8
7
6
5
4
0
1000
2000
3000
4000
5000
6000
7000
8000
Time (sec)

SLUG TEST DATA FORM (UNCONFINED AQUIFER)

Fill In Data

Automatic Calculations

Project Name/ Address:	**Petty Machine Co / 2403 Forbes Rd, Gastonia, NC**		
S&ME Project Number:	**4335-15-109, Ph 06**		
Monitoring Well ID:	**MW-8**	**Well Installation Date:**	**2/2/1993**
Date of Test:	**8/19/2016**	**Troll 700 Serial Number:**	
Datalogger File Name:	**MW-8_2016-08-19_16-06-58-174.csv**		
Weather/Temperature:	**Hot 90s**		
Field Team Members:	**Travis O. & Kelsey M.**		
Data Logger Record Method:	**Troll 700 - 360693**		
Well Type :	**Unconfined, Shallow, Regolith**		

(Unconfined/Confined; Shallow/Deep; Regolith/Bedrock)

Method of Slug Test	
Pump	
Bailer	
Artificial Slug	X

Artificial Slug		
Material (Stainless Steel, PVC)	Stainless Steel	
Diameter	ft	0.122
Length	ft	4.09
Base of Aquifer Method:		
Set Depth (blank if not used)	ft-bgs	
Feet below Sandpack	ft	5

Slug Test - Initial Data	**Time (00:00)**	**WL>Probe (ft)**	**Initial Change (ft)**	**WL @ 95% Recovery (ft)**	**WL @ 60% Recovery (ft)**
Slug-In Test #1:	14:03	8.627	1.141	8.684	9.083
Slug-Out Test #1:	15:05	8.694	2.699	8.559	7.614
Slug-In Test #2:			0.000	0.000	0.000
Slug-Out Test #2:			0.000	0.000	0.000

Comments (unusual conditions, etc.):

Manual DTW-TOCs and Probe readings: Water above probe (WL>Probe) and Temperature	
Time (00:00)	**Manual DTW (ft-TOC) after Probe Inserted ~ stabilized water level**
13:44	40.02
13:48	40.03
14:00	40.04
14:01	40.05

Transducer readings for stabilization check (WinSitu)		
Time (00:00)	**Probe Temp (°C)**	**WL>Probe(ft)**
13:40	19.9	9.64
13:48	17.9	8.62
13:58	17.7	8.61
14:00	17.7	8.62

Well Data			
Description	**Value**	**Unit**	
Well Stickup	-0.25	ft-ags	
Ground Surface Elevation	0.00	ft	
Well Log Data			
Open Hole/Well Diameter (inner)	2.00	in	
Borehole Diameter (Screen Zone)	8.50	in	
Top of Bentonite Seal	35.70	ft-bgs	
Top of Sandpack	37.70	ft-bgs	
Top of Well Screen	39.70	ft-bgs	
Base of Well Screen	49.70	ft-bgs	
Bottom Well Sump below Screen	0.00	ft	
Base of Boring (Sand Pack)	49.70	ft-bgs	
Screen Length	10.00	ft-bgs	
Measured Depths			
DTW Time Measured	12:05		
Measured Depth to Water	40.05	ft-toc	
Measured Total Well Depth	49.45	ft-toc	
Calculated from Measured Depths			
Top of Sandpack	37.70	ft-bgs	
Top of Well Screen	39.70	ft-bgs	
Depth to Water	40.30	ft-bgs	
Sand pack above screen	2.00	ft	
Sand pack below screen	0.00	ft	
Base of Well Screen	49.70	ft-bgs	
Base of Sand Pack/Boring	49.70	ft-bgs	

AQTESOLV Data			
Description	**Value**	**Unit**	**Variable**
Water Level above Sandpack?	-2.60	ft	
No			
Initial Displacement - Slug In	1.141	ft	H(0)
Initial Displacement - Slug Out	2.699	ft	H(0)
Static Water Column Height	9.40	ft	H
* Above base of sand pack			
Saturated Aquifer Thickness	14.40	ft	b
Aquifer Anisotropy	1.00	unitless	Kv/Kh
Depth to Top of Well Screen (<WL)	0.00	ft	d
* includes sandpack above screen			
Screen Length (inc. sandpack)	9.40	ft	L
Total Penetration Depth	9.40	ft	d+L
Transducer Depth (Slug In)	8.627	ft	T
Transducer Depth (Slug Out)	8.694	ft	T
* Water above probe			
Inside Radius of Well Casing	0.0833	ft	r(c)
Radius of Downhole Equipment	0.000	ft	r(eq)
Inside Radius of Packer	0.000	ft	r(p)
Radius of Well (borehole)	0.354	ft	r(w)
Outer Radius of Well (well skin)	0.354	ft	r(sk)
Effective Casing Radius			
Sand Pack Effective Porosity	0.30	unitless	n(e)
Kinematic Viscosity	1.20E-06	m^2/sec	
Gravitational acceleration	9.81	m/sec^2	

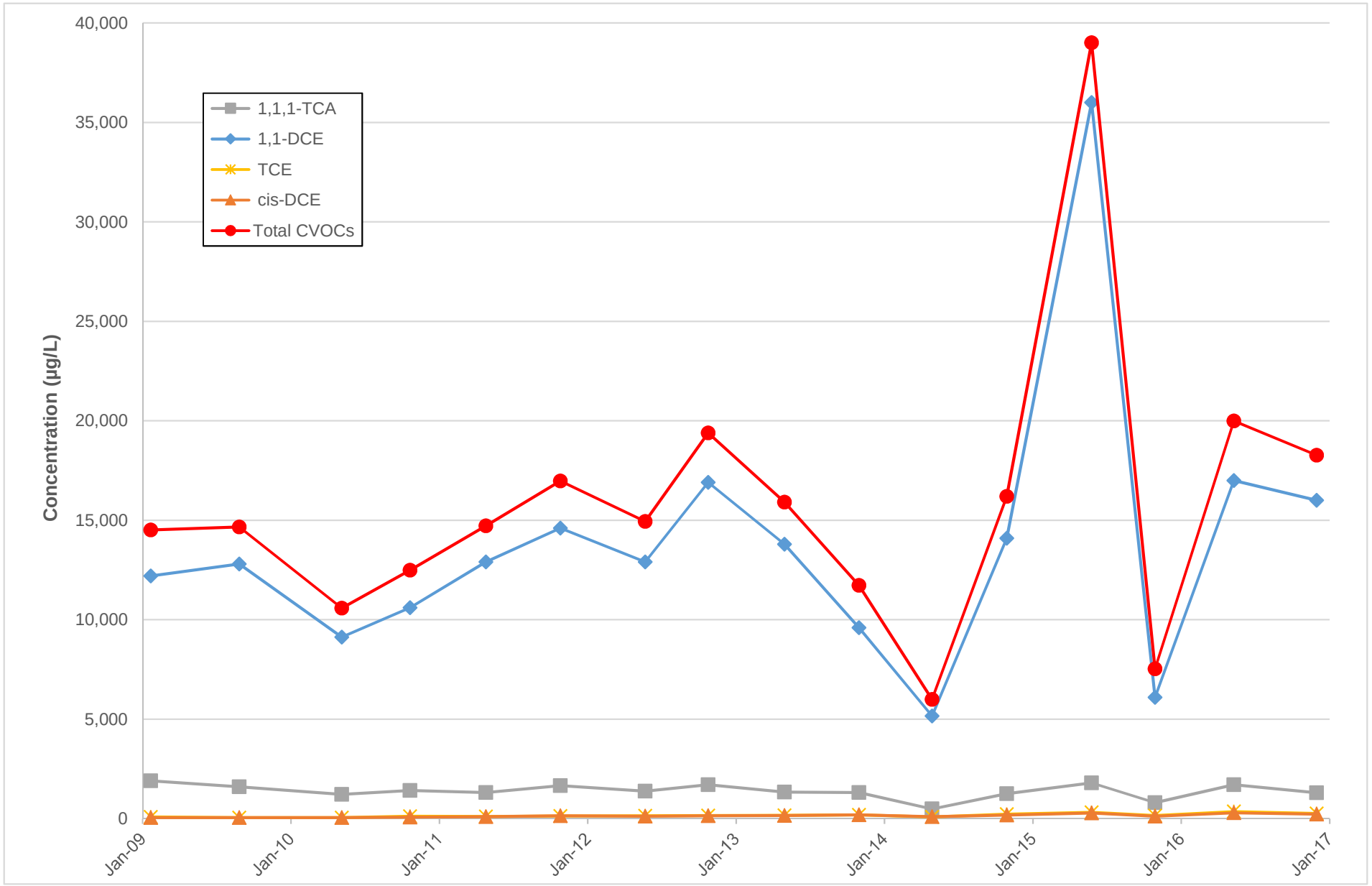
Signatures: **Date:**

Revision Date: 8/16/2016

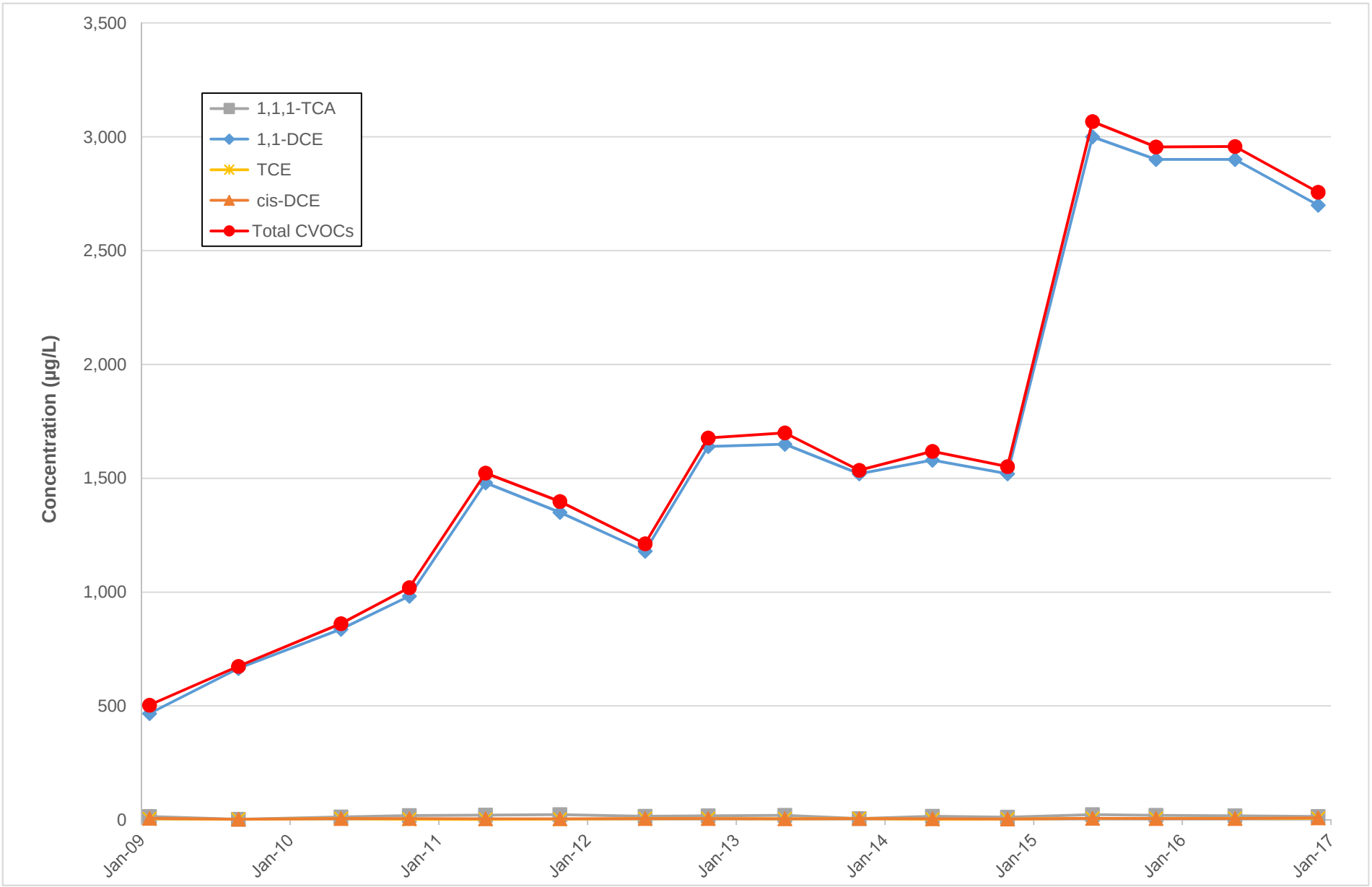
Appendix B

CVOC Concentration vs Time Graphs

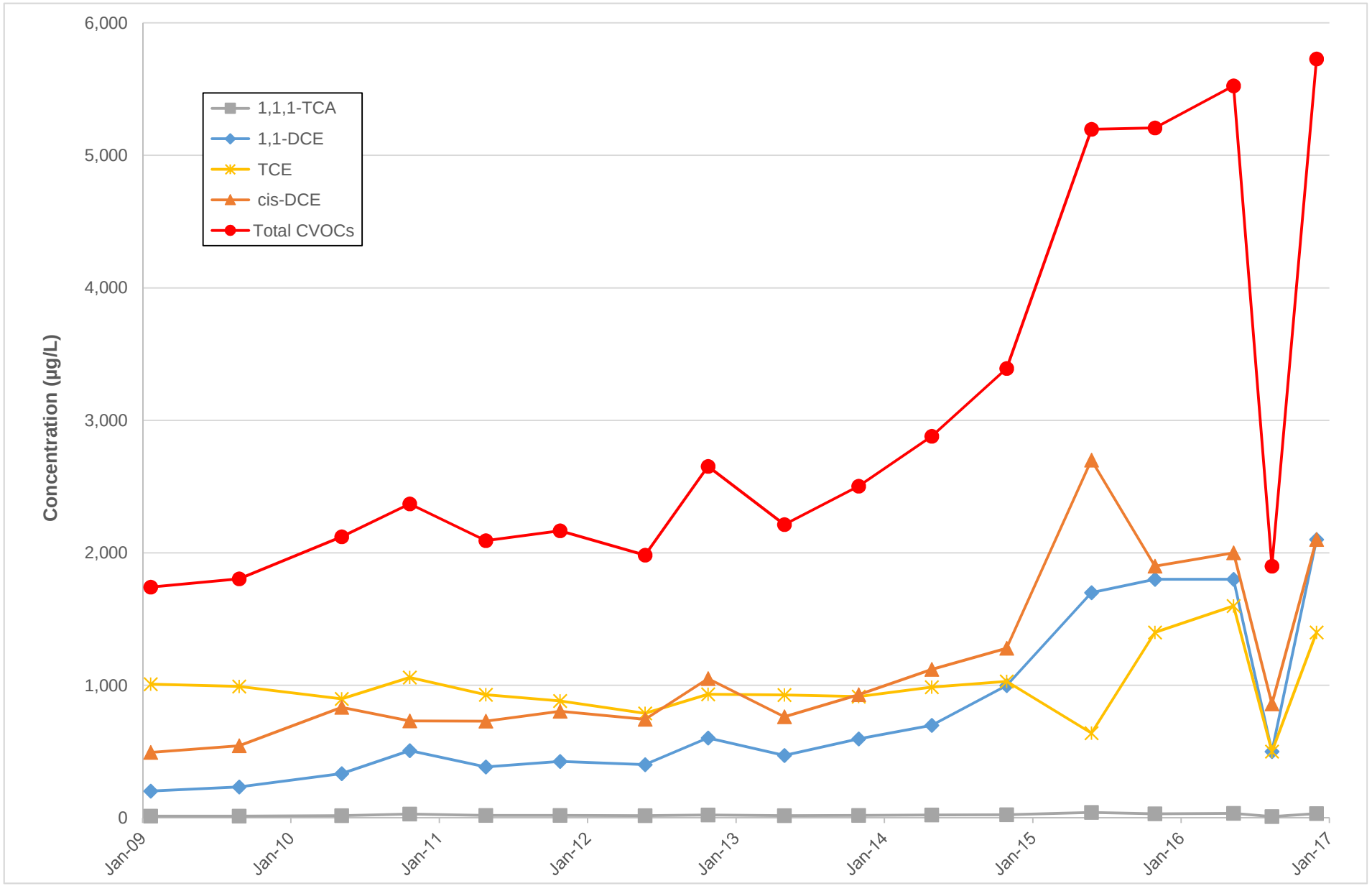
MW-1 Chlorinated VOC Concentrations vs. Time
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001



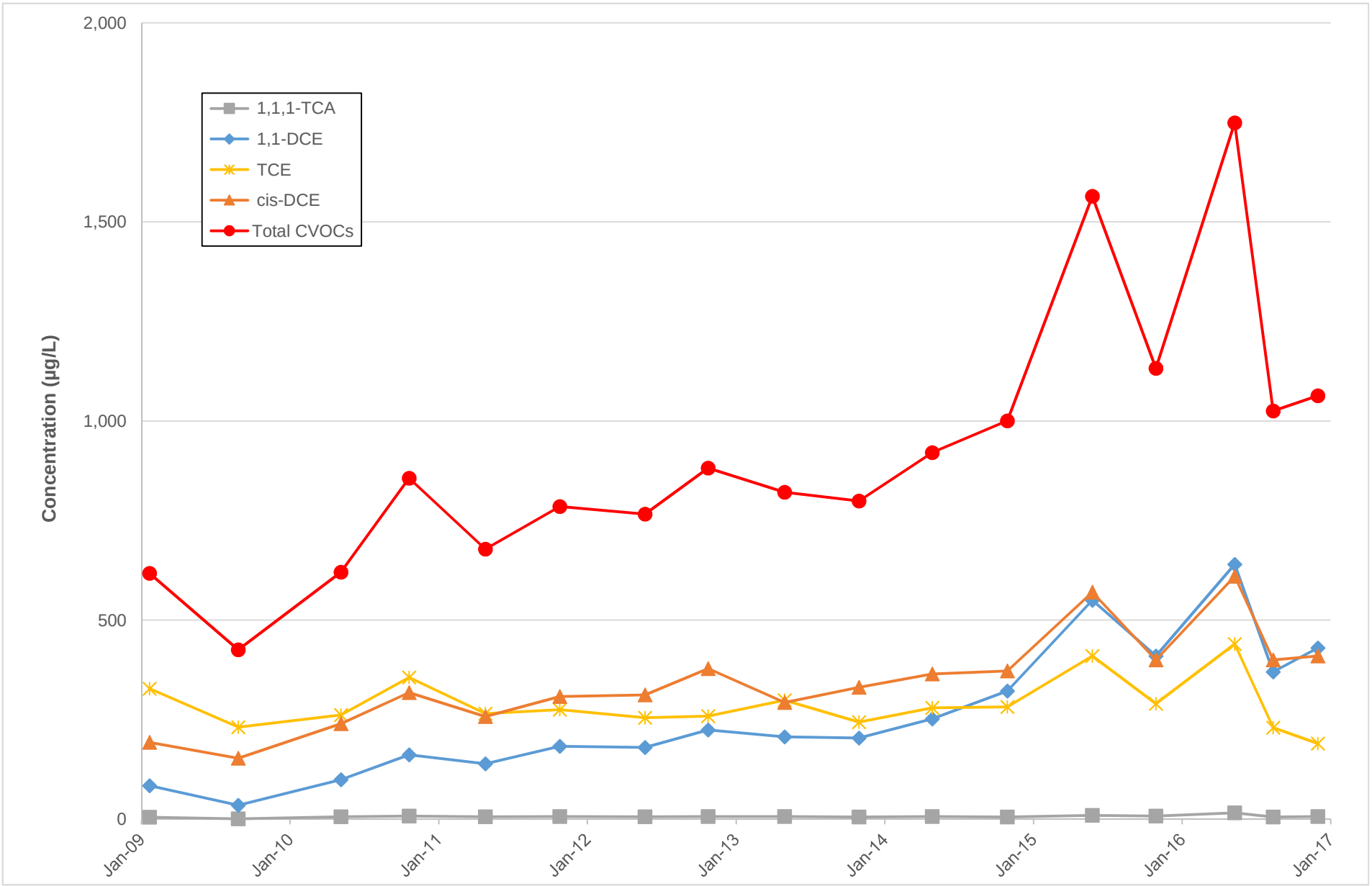
MW-6 Chlorinated VOC Concentrations vs. Time
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001



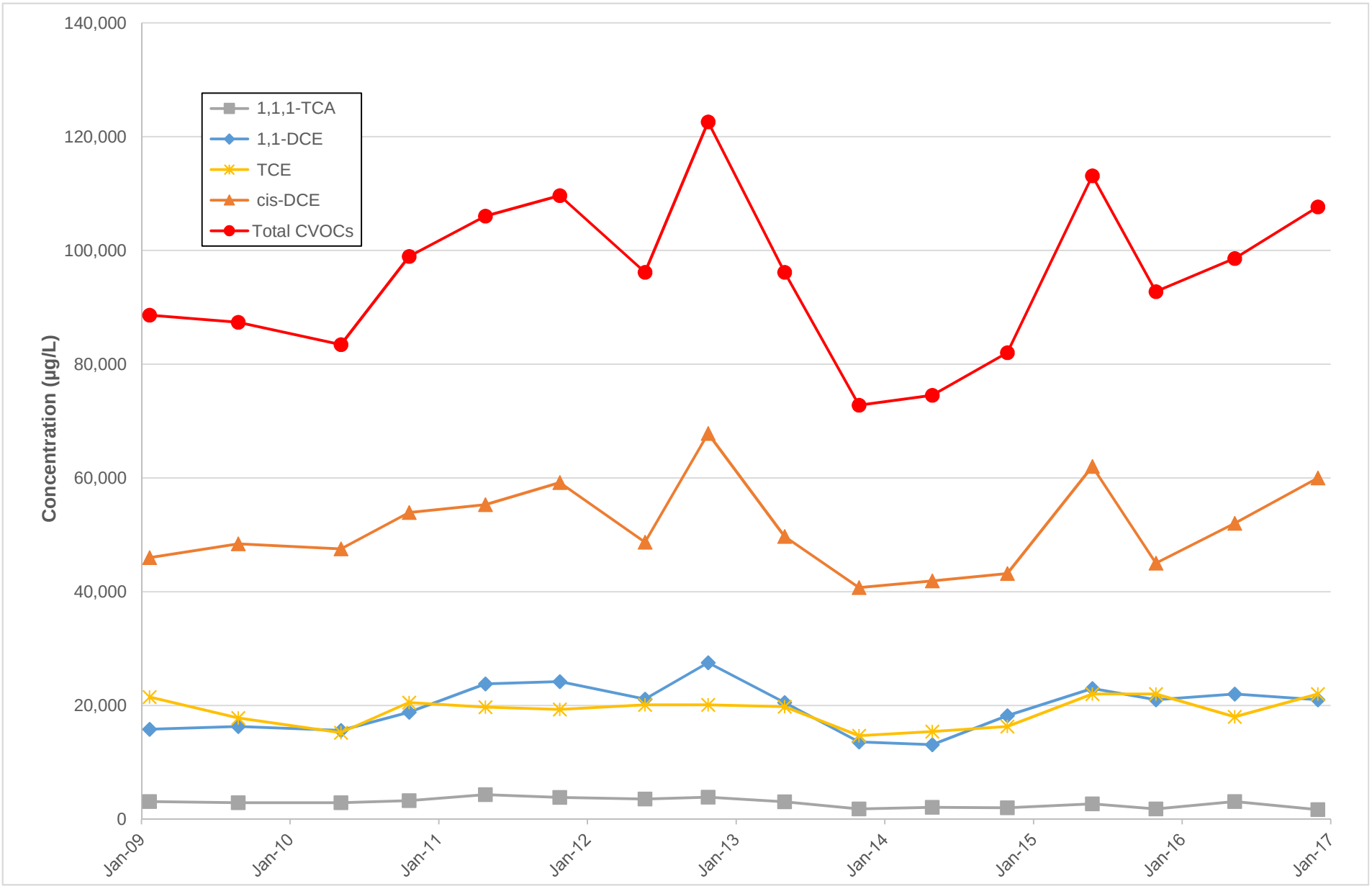
MW-7A Chlorinated VOC Concentrations vs. Time
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001



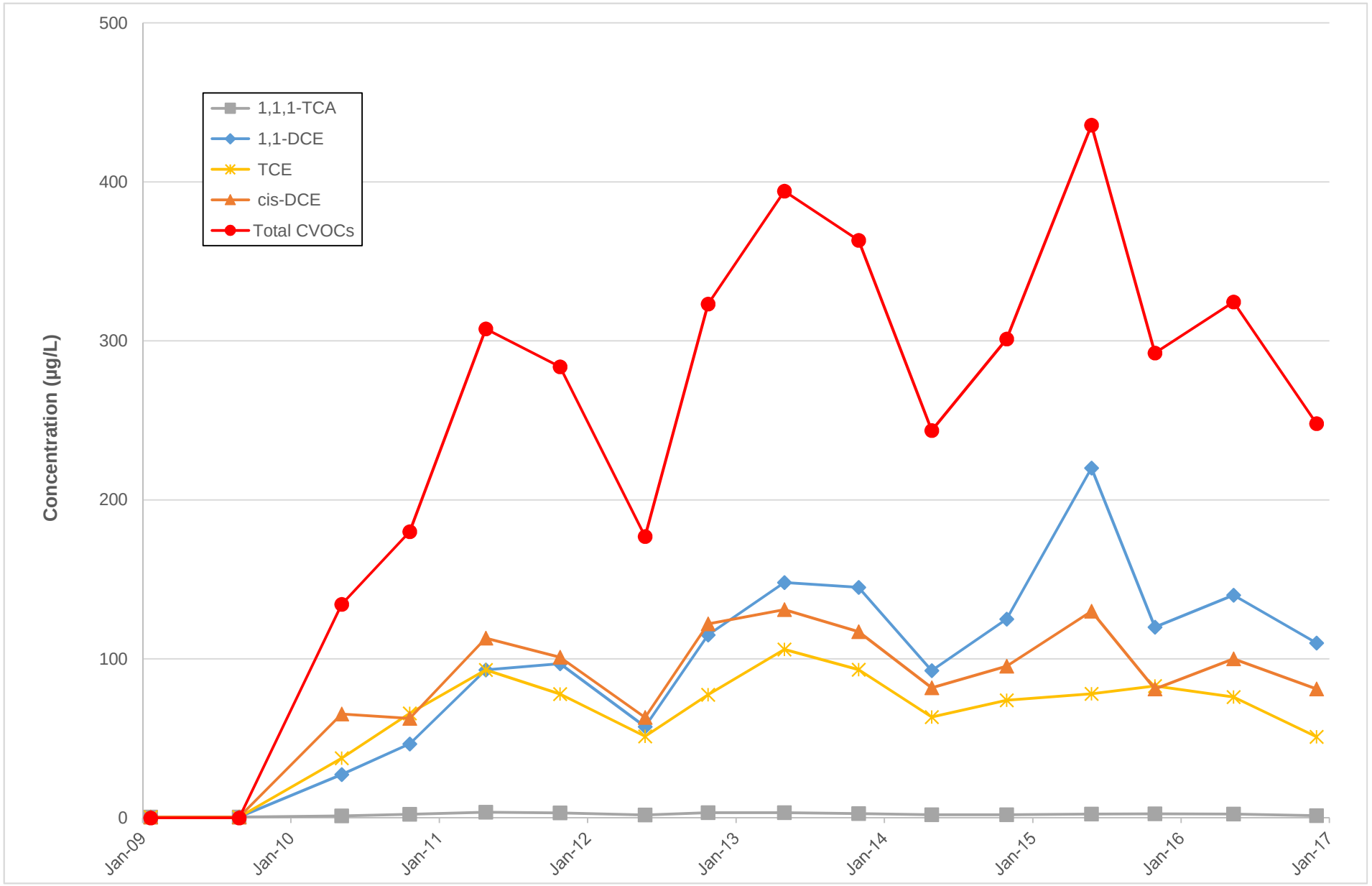
MW-7B Chlorinated VOC Concentrations vs. Time
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001



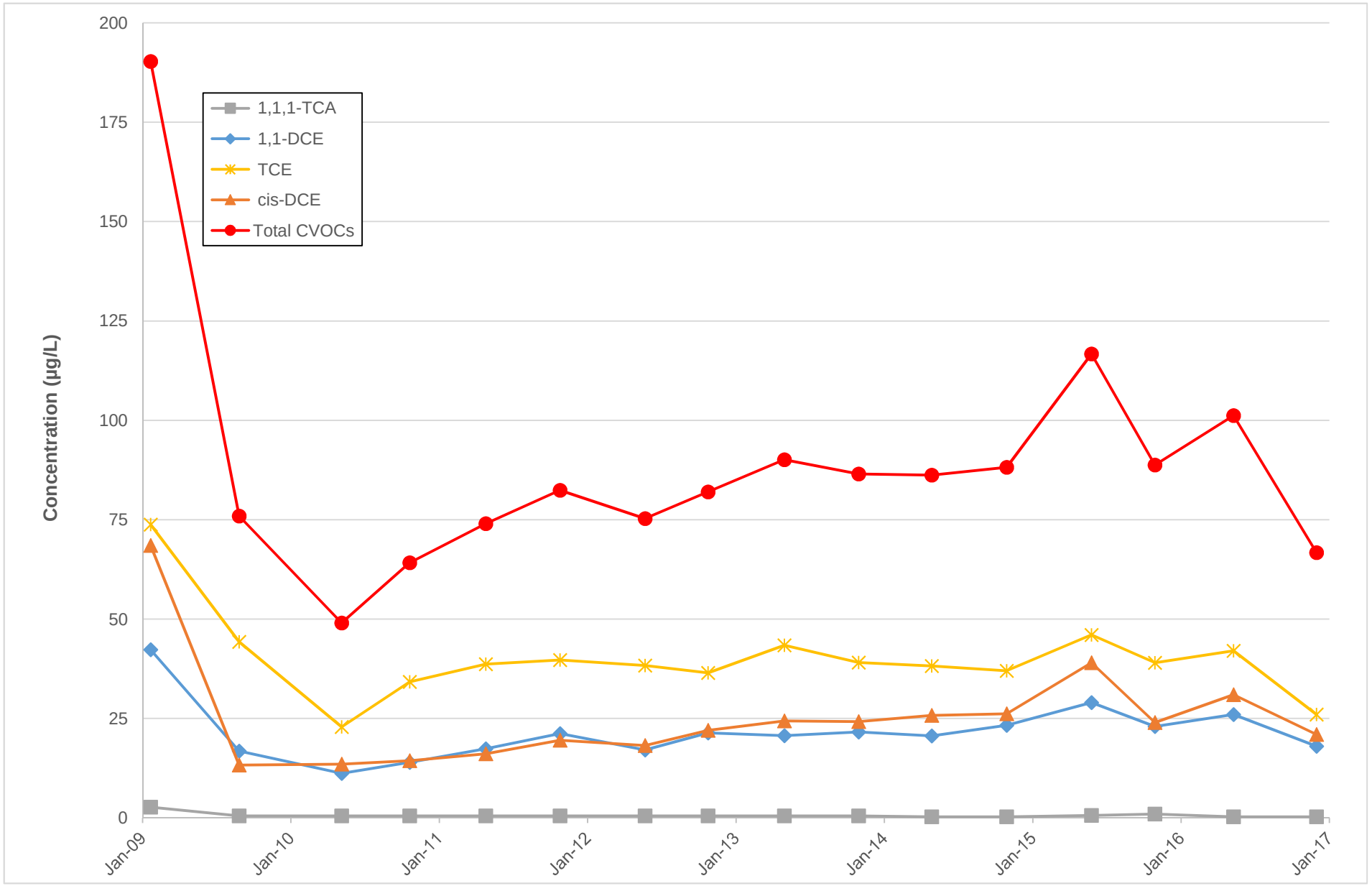
MW-8 Chlorinated VOC Concentrations vs. Time
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001



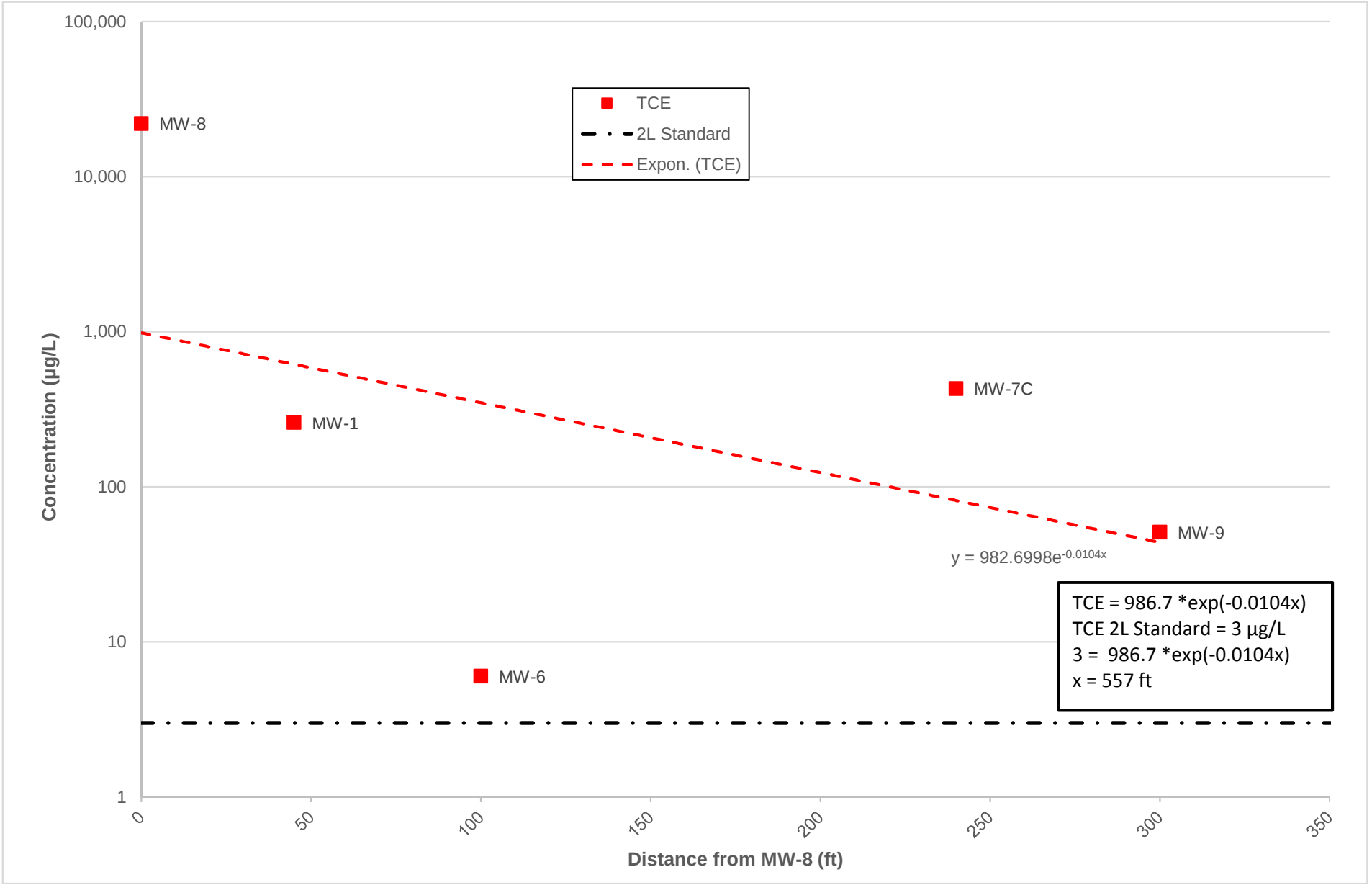
MW-9 Chlorinated VOC Concentrations vs. Time
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001



MW-9A Chlorinated VOC Concentrations vs. Time
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001



Estimated Distance for TCE to Meet 2L Standards
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001



Appendix C

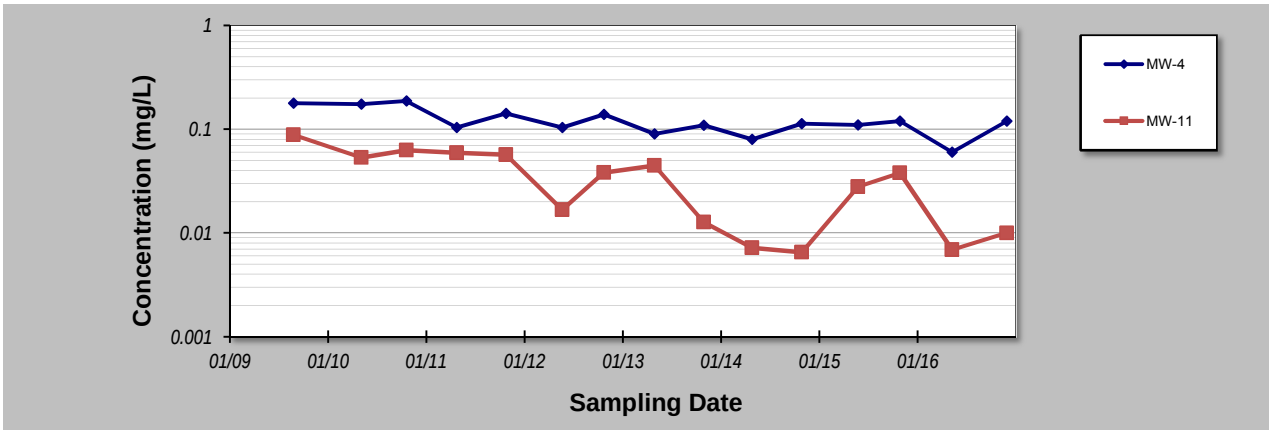
Chromium Mann-Kendall Analysis

Chromium Mann-Kendall Analysis
Petty Machine Company
Gastonia, North Carolina
H&H Job No. PTY-001

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date:	12-Apr-17	Job ID:	
Facility Name:	Petty Machine	Constituent:	Chromium
Conducted By:	Jason Tillotson	Concentration Units:	mg/L

Sampling Point ID:	MW-4	MW-11					
Sampling Event	Sampling Date	CHROMIUM CONCENTRATION (mg/L)						
1	27-Aug-09	0.178	0.0882					
2	6-May-10	0.174	0.0534					
3	21-Oct-10	0.187	0.0629					
4	26-Apr-11	0.104	0.0593					
5	26-Oct-11	0.142	0.0567					
6	22-May-12	0.104	0.0167					
7	24-Oct-12	0.139	0.0381					
8	30-Apr-13	0.0899	0.0447					
9	30-Oct-13	0.109	0.0127					
10	28-Apr-14	0.0801	0.0072					
11	29-Oct-14	0.113	0.0065					
12	27-May-15	0.11	0.028					
13	29-Oct-15	0.12	0.038					
14	10-May-16	0.06	0.0069					
15	30-Nov-16	0.12	0.01					
16								
17								
18								
19								
20								
Coefficient of Variation:		0.30	0.72					
Mann-Kendall Statistic (S):		-37	-67					
Confidence Factor:		96.3%	>99.9%					
Concentration Trend:		Decreasing	Decreasing					



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

Appendix D

Substrate Estimating Tool Results

hart hickman

SMARTER ENVIRONMENTAL SOLUTIONS

SUBSTRATE ESTIMATING TOOL FOR ENHANCED ANAEROBIC BIOREMEDIATION OF CHLORINATED SOLVENTS

Version 1.2
November 2010

Site Data Input Table

TABLE S.1 - INPUT TABLE

Calculation Tables

Table S.2 - Substrate Calculations in Hydrogen Equivalents

Table S.3 - Hydrogen Produced by Common Substrates

Table S.4 - Estimated Substrate Requirements for Hydrogen Demand

Output Summary Table

TABLE S.5 - OUTPUT TABLE

PRINT SUMMARY TABLE

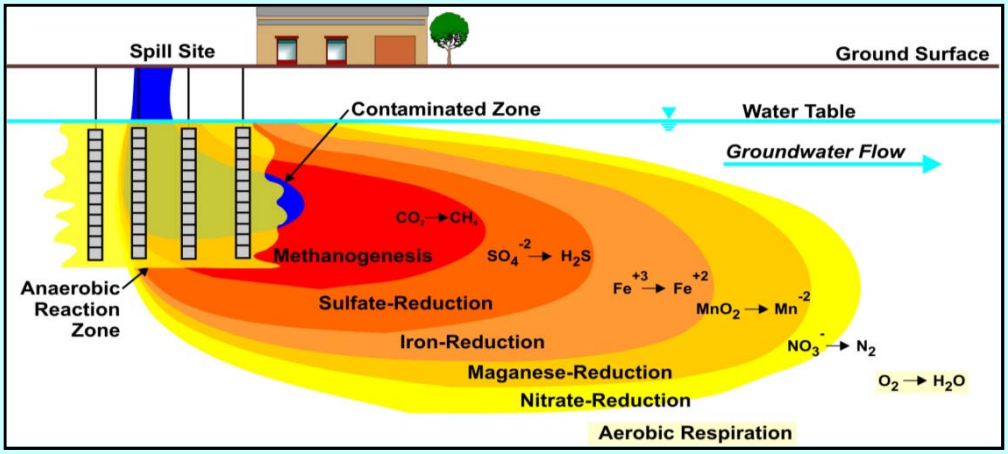


Table S.1 Input for Substrate Requirements in Hydrogen Equivalents

Site Name: Petty Machine Company

RETURN TO COVER PAGE

NOTE: Unshaded boxes are user input.

1. Treatment Zone Physical Dimensions	Values	Range	Units	User Notes
Width (Perpendicular to predominant groundwater flow direction)	20	1-10,000	feet	
Length (Parallel to predominant groundwater flow)	20	1-1,000	feet	
Saturated Thickness	40	1-100	feet	
Treatment Zone Cross Sectional Area	800	--	ft^2	
Treatment Zone Volume	16,000	--	ft^3	
Treatment Zone Total Pore Volume (total volume x total porosity)	35,914	--	gallons	
Treatment Zone Effective Pore Volume (total volume x effective porosity)	35,914	--	gallons	
Design Period of Performance	2.0	.5 to 5	year	
Design Factor (times the electron acceptor hydrogen demand)	10.0	2 to 20	unitless	
2. Treatment Zone Hydrogeologic Properties				
Total Porosity	30%	.05-50	percent	Unknown, assumed
Effective Porosity	30%	.05-50	percent	Unknown, assumed
Average Aquifer Hydraulic Conductivity	4.8	.01-1000	ft/day	Geometric mean from S&ME 2016 slug tests
Average Hydraulic Gradient	0.026	0.0001-0.1	ft/ft	From May 2016
Average Groundwater Seepage Velocity through the Treatment Zone	0.42	--	ft/day	
Average Groundwater Seepage Velocity through the Treatment Zone	151.8	--	ft/yr	
Average Groundwater Discharge through the Treatment Zone	272,656	--	gallons/year	
Soil Bulk Density	1.5	1.4-2.0	gm/cm^3	Unknown, assumed
Soil Fraction Organic Carbon (foc)	0.05%	0.01-10	percent	Unknown, assumed
3. Native Electron Acceptors				
A. Aqueous-Phase Native Electron Acceptors				
Oxygen	0.3	0.01 to 10	mg/L	MW-8, August 2016
Nitrate	0.47	0.1 to- 20	mg/L	MW-8, August 2016
Sulfate	1	10 to 5,000	mg/L	MW-8, August 2016
Carbon Dioxide (estimated as the amount of Methane produced)	10.0	0.1 to 20	mg/L	Unknown, assumed
B. Solid-Phase Native Electron Acceptors				
Manganese (IV) (estimated as the amount of Mn (II) produced)	5	0.1 to 20	mg/L	Unknown, assumed
Iron (III) (estimated as the amount of Fe (II) produced)	20	0.1 to 20	mg/L	Unknown, assumed
4. Contaminant Electron Acceptors				
Tetrachloroethene (PCE)	0.000	--	mg/L	
Trichloroethene (TCE)	22.000	--	mg/L	MW-8, November 2016
Dichloroethene (cis-DCE, trans-DCE, and 1,1-DCE)	81.000	--	mg/L	MW-8, November 2016
Vinyl Chloride (VC)	0.000	--	mg/L	
Carbon Tetrachloride (CT)	0.000	--	mg/L	
Trichloromethane (or chloroform) (CF)	0.000	--	mg/L	
Dichloromethane (or methylene chloride) (MC)	0.000	--	mg/L	
Chloromethane	0.000	--	mg/L	
Tetrachloroethane (1,1,1,2-PCA and 1,1,2,2-PCA)	0.000	--	mg/L	
Trichloroethane (1,1,1-TCA and 1,1,2-TCA)	1.700	--	mg/L	MW-8, November 2016
Dichloroethane (1,1-DCA and 1,2-DCA)	2.700	--	mg/L	MW-8, November 2016
Chloroethane	0.000	--	mg/L	
Perchlorate	0.000	--	mg/L	
5. Aquifer Geochemistry (Optional Screening Parameters)				
A. Aqueous Geochemistry				
Oxidation-Reduction Potential (ORP)	295	-400 to +500	mV	MW-8, August 2016
Temperature	20	5.0 to 30	ºC	MW-8 Average
pH	4.5	4.0 to 10.0	su	MW-8, August 2016
Alkalinity	2	10 to 1,000	mg/L	MW-8, August 2016
Total Dissolved Solids (TDS, or salinity)	100	10 to 1,000	mg/L	Unknown, assumed
Specific Conductivity	123	100 to 10,000	µs/cm	MW-8, August 2016
Chloride	0	10 to 10,000	mg/L	Unknown
Sulfide - Pre injection	0.0	0.1 to 100	mg/L	Unknown, assumed
Sulfide - Post injection	0.0	0.1 to 100	mg/L	Unknown, assumed
B. Aquifer Matrix				
Total Iron	100	200 to 20,000	mg/kg	Unknown, assumed
Cation Exchange Capacity	NA	1.0 to 10	meq/100 g	Unknown
Neutralization Potential	1.0%	1.0 to 100	Percent as $CaCO_3$	Unknown, low alkalinity so assumed

NOTES:

Calculations per injection well

Table S.5 Output for Substrate Requirements in Hydrogen Equivalents

Site Name: Petty Machine Company

RETURN TO COVER PAGE

1. Treatment Zone Physical Dimensions

	Values	Units	Values	Units
Width (perpendicular to groundwater flow)	20	feet	6	meters
Length (parallel to groundwater flow)	20	feet	6.1	meters
Saturated Thickness	40	feet	12.2	meters
Design Period of Performance	2	years	2	years

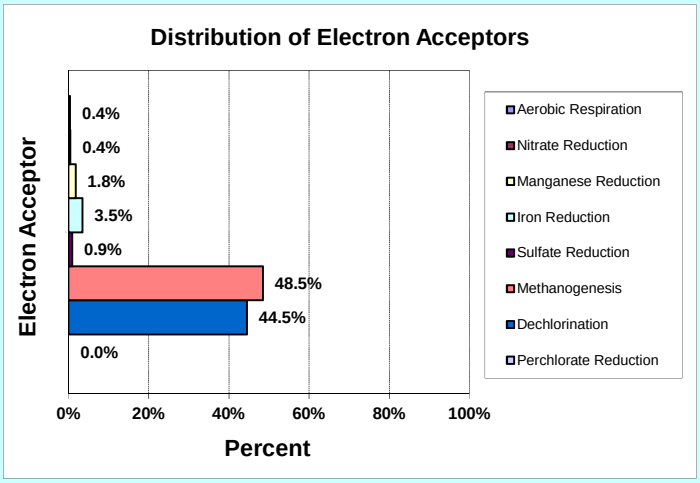
2. Treatment Zone Hydrogeologic Properties

	Values	Units	Values	Units
Total Porosity	0.3	percent	0.3	percent
Effective Porosity	0.3	percent	0.3	percent
Average Aquifer Hydraulic Conductivity	4.8	ft/day	1.7E-03	cm/sec
Average Hydraulic Gradient	0.026	ft/ft	0.026	m/m
Average Groundwater Seepage Velocity	0.42	ft/day	1.3E+01	cm/day
Average Groundwater Seepage Velocity	152	ft/yr	46.3	m/yr
Effective Treatment Zone Pore Volume	35,914	gallons	135,944	liters
Groundwater Flux (per year)	272,656	gallons/year	1,032,087	liters/year
Total Groundwater Volume Treated (over entire design period)	581,226	gallons total	2,200,117	liters total

3. Distribution of Electron Acceptor Demand

	Percent of Total	Hydrogen Demand (lb)
Aerobic Respiration	0.4%	0.195
Nitrate Reduction	0.4%	0.220
Sulfate Reduction	0.9%	0.448
Manganese Reduction	1.8%	0.890
Iron Reduction	3.5%	1.751
Methanogenesis	48.5%	24.372
Dechlorination	44.5%	22.356
Perchlorate Reduction	0.0%	0.000
Totals:	**100.00%**	**50.23**

Hydrogen demand in pounds/gallon:	8.64E-05
Hydrogen demand in grams per liter:	1.04E-02



4. Substrate Equivalents: Design Factor = 10.0

Product	Quantity (lb)	Quantity (gallons)	Effective Concentration (mg/L)	Effective concentration is for total volume of groundwater treated.
1. Sodium Lactate Product	23,283	2,117	2,314	as lactic acid
2. Molasses Product	17,769	1,481	2,198	as sucrose
3. Fructose Product	14,031	1,253	2,314	as fructose
4. Ethanol Product	7,174	1,040	1,183	as ethanol
5. Sweet Dry Whey (lactose)	11,067	sold by pound	1,597	as lactose
6. HRC®	8,507	sold by pound	1,403	as 40% lactic acid/40% glycerol
7. Linoleic Acid (Soybean Oil)	4,368	560	901	as soybean oil
8. Emulsified Vegetable Oil	7,280	933	901	as soybean oil

Notes:
1. Quantity assumes product is 60% sodium lactate by weight.
2. Quantity assumes product is 60% sucrose by weight and weighs 12 pounds per gallon.
3. Quantity assumes product is 80% fructose by weight and weighs 11.2 pounds per gallon.
4. Quantity assumes product is 80% ethanol by weight and weighs 6.9 pounds per gallon.
5. Quantity assumes product is 70% lactose by weight.
6. Quantity assumes HRC® is 40% lactic acid and 40% glycerol by weight.
7. Quantity of neat soybean oil, corn oil, or canola oil.
8. Quantity assumes commercial product is 60% soybean oil by weight.