



CORRECTIVE ACTION PLAN

Meadows of Dan Food Market
2609 Jeb Stuart Highway
Meadows of Dan, Virginia 24120

PC# 2014-2256
Greene Project# FMMD1005

June 30, 2015

DEQ Case Manager:
Mr. Douglas B. Carl

CORRECTIVE ACTION PLAN

**Meadows of Dan Food Market
2609 Jeb Stuart Highway
Meadows of Dan, Virginia 24120
PC# 2014-2256**

Submitted To:

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June 30, 2015

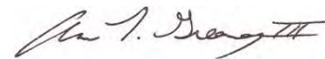
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EXECUTIVE SUMMARY

Corrective Action Plan

During development of this CAP, Greene considered several remediation technologies for long term implementation at the Meadows of Dan Food Market facility. After exploring the merits and limitations of each option, Dual Phase Extraction has been identified as the best fit technology for efficient and cost effective remediation of the petroleum release currently under study at the subject site. Based on the current petroleum mass estimate and the predicted recovery rates, approximately one year of continuous system operation is projected to achieve free phase endpoints. This projection will continuously be updated during CAP Implementation as data is collected.

The VA DEQ has issued the Meadows of Dan Food Market facility coverage under the VPDES General Permit for the discharge of system effluent water. At this time, it is expected that an air permit for the system effluent air discharge from the proposed system will not be required; however, an Air Operating Permit Application requesting a non-binding applicability determination has been submitted to the VA DEQ for confirmation.

Following CAP approval, Greene will complete site preparation activities and solicit bids for the purchase of a DPE system. Current build times indicate an approximate three month lag between bid acceptance and system delivery.

This Executive Summary is an integral part of the Corrective Action Plan. Greene recommends that the report be read in its entirety.

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F. Recovery Estimate Calculations

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G. General VPDES Permit VAG83

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Submittal Letter Dated June 30, 2015
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J. Associated Documents

VA DEQ Request Letter Dated March 19, 2015
Public Notice Verification – The Enterprise

CORRECTIVE ACTION PLAN
for
Meadows of Dan Food Market
Meadows of Dan, VA

1.0 Introduction

On behalf of T&M, M of D, LLC, Greene Environmental Services, LLC (Greene) has prepared a Corrective Action Plan (CAP) for the Meadows of Dan Food Market facility located at 2609 Jeb Stuart Highway in Patrick County, Virginia. Subsequent to Greene's submittal of the Interim Authorization Corrective Action Plan Implementation report (IA CAP IMP), the Virginia Department of Environmental Quality (VA DEQ) requested the preparation and submittal of a CAP to address the free phase petroleum identified on the Meadows of Dan Food Market property. As stated in the VA DEQ Corrective Action Plan request letter dated March 19, 2015, corrective action will be implemented at the facility until the requested endpoint of <0.01 feet of product thickness has been achieved. A copy of the VA DEQ request letter dated March 19, 2015 is included in Appendix J of this report. A comprehensive summary of Pollution Complaint (PC) #2014-2256 is provided in Section 3.0 of this report.

2.0 Site Assessment

2.1 Site Location and Description

The subject property is an approximately 1.07-acre parcel located at 2609 Jeb Stuart Highway in a primarily commercial and residential area within the limits of Patrick County, Virginia. The subject site is improved with a two-story building that serves as the Meadows of Dan Food Market, as well as a coin-operated laundromat and rental apartment. It is believed that the subject site has operated as a retail gasoline station and convenience store from approximately 1976 to present. As part of underground storage tank (UST) system upgrade activities, one 10,000-gallon regular gasoline UST (UST #1) and one 10,000-gallon premium gasoline UST (UST #2) located within a common basin were removed from the ground on December 30, 2013. The subject site currently maintains one 10,000-gallon gasoline UST and one 8,000-gallon compartmental UST containing gasoline and kerosene. In addition, the property maintains two gasoline dispensers and one kerosene dispenser. The subject site is further improved with asphalt access and parking areas. The Meadows of Dan Food Market obtains potable water from a drilled supply well located within the store building approximately 75 feet northwest of the former tank basin. The subject site is bordered by Jeb Stuart Highway to the south, Baptist Church Lane to the north, and commercial properties to the east and west. A Site Map documenting pertinent features of the site and surrounding area is included in Appendix B.

2.2 Topography

The subject site is located at 2609 Jeb Stuart Highway within the limits of Patrick County, Virginia. According to the U.S. Geological Survey 7 ½ Minute Series Topographic Map of the Meadows of Dan Quadrangle, Virginia, the site elevation is approximately 2,968 feet above mean sea level. At its closest point, the nearest identified surface water body, an unnamed intermittent tributary to Tuggle Creek, is located approximately 950 feet to the east. An aerial map and topographic map of the subject site are included in Appendix B.

2.3 Local Geology

Greene reviewed the Geologic Map of Virginia prepared by the Commonwealth of Virginia, Department of Mines, Minerals, and Energy. Published geologic information indicates that local geologic structures are primarily comprised of rocks of the Alligator Back Formation. This rock formation is described by Espenshade et al (1975) as consisting of finely laminated gneiss with thick layers of schist, phyllite, amphibolite, or greenstone. Specifically, the site lies within the aba sub-unit of the Alligator Back Formation, which consists of amphibolite, garnet amphibolite, and greenstone interbedded with biotite-muscovite gneiss and metapelite. The strike of the mapped contact between the Alligator Back formation and the aba sub-unit is approximately 78 degrees.

The micaceous nature of the underlying geology is evident in the soils encountered during drilling, where the relict structure of the rocks is preserved in the residual soils. The soils were observed to be mica rich with relict bands of quartz which are common in gneissic and schistose rocks. During trenching activities performed as part of IA CAP IMP activities, the strike of the metamorphic foliations was measured by Greene to be 68-70 degrees, consistent with the mapped strike of the formation contacts. The dip of the foliations was measured to be 79 degrees to the southeast. The metamorphic foliations exert a strong influence on the migration of free product and dissolved phase hydrocarbons at the site. This is evidenced by the marked disparity between the observed groundwater gradient and the observed plumes, which is not unusual in geologic environments with strong geologic structures. The groundwater gradient in the vicinity of the subject site is approximately 166 degrees, becoming slightly more eastward to the south. In contrast, the observed plumes are oriented almost 90 degrees to the direction of groundwater gradient.

3.0 Comprehensive Summary of Pollution Complaint #2014-2256

3.1 Initial Abatement Measures Report

On December 30, 2013, Paul R. Shively, Inc. (PRS) of Floyd, Virginia contracted Greene to collect the required samples and document the removal of two 10,000-gallon gasoline USTs located at the Meadows of Dan Food Market facility. Soil samples collected during the excavation and removal of the USTs revealed elevated volatile organic compound (VOC) vapors typically associated with petroleum fuels. Greene also observed petroleum stained soils on the former shared UST basin sidewalls and floor. Subsequent to these findings, Greene reported the release to the Blue Ridge Regional Office (BRRO) of the VA DEQ on December 30, 2013. In a letter dated January 6, 2014, the Roanoke branch of the Blue Ridge Regional Office (BRRO-ROA) issued the site PC #2014-2256 and requested that Initial Abatement Measures and Reporting (IAMR) activities be conducted. The owner of the Meadows of Dan Food Market, T&M, M of D, LLC, contracted Greene Environmental Services, LLC to perform the requested IAMR activities.

During the IAMR, a total of 409.92 tons of petroleum impacted soils were removed from the site and disposed of at a treatment facility. In addition, Greene collected soil samples subsequent to overexcavation activities, which indicated that elevated petroleum contamination remained onsite. Analytical results of the soil samples indicated that elevated petroleum contamination remained on the former basin east sidewall, south sidewall, and floor primarily proximal to the east end of the former premium gasoline UST. Analytical results of soil sample SW10, collected from the south sidewall proximal to the east end of the former premium gasoline UST, yielded the highest total petroleum hydrocarbon-gasoline range organics (TPH-GRO) concentration of 5,520 milligrams per kilogram (mg/kg). In addition, soil sample D01 collected from the former gasoline dispenser #1 location yielded a TPH-GRO concentration of 2,390 mg/kg. The locations of the IAMR soil samples are included on the IAMR Soil Sample Location Map provided in Appendix B. Table 1 included in Appendix A, Page 1 is a summary of the IAMR residual phase analytical results. Subsequent to completion of this phase of work, a copy of the IAMR dated January 24, 2014 was submitted to the VA DEQ.

3.2 Site Characterization Report

As requested in the January 6, 2014 VA DEQ letter, following the submittal of the IAMR Greene then performed site characterization and reporting (SCR) activities at the subject site. During the SCR phase of work Greene installed six soil borings (B01-B06) and converted the soil borings to monitoring wells MW01-MW06. In addition, Greene performed aquifer characterization, a receptor survey, and sampling activities. Analytical results of the submitted soil samples yielded evidence of significant residual phase petroleum contamination at soil boring locations B01, B02, and B03. However, the majority of the significant residual

phase contamination was observed within or proximal to the estimated smear zone and is likely not located within the source of contamination. Limited residual phase contamination was observed within or proximal to the estimated smear zone at soil boring B04, however, soil samples collected from soil borings B05 and B06 did not yield evidence of residual phase petroleum contamination. The locations of the soil borings are included on the Soil Boring Location Map provided in Appendix B. Table 2 included in Appendix A, Page 3 is a summary of the soil boring residual phase analytical results. Monitoring well construction diagrams are included on the Soil Boring Logs provided as Appendix C.

Subsequent to installation of the groundwater monitoring wells, Greene performed aquifer characterization activities. A potentiometric surface map generated from the relative elevations of equilibrated groundwater measured during SCR activities depicted a primarily south hydraulic gradient. Table 3 included in Appendix A, Page 9 is a summary of the groundwater elevation data. The locations of the monitoring wells are included on the Monitoring Well Location Map provided in Appendix B. A potentiometric surface map generated from the relative elevations of equilibrated groundwater as measured during SCR activities is included in Appendix B. Further aquifer characterization included the performance of a pump-down rising head test on monitoring well MW05. The pump-down test yielded a calculated hydraulic conductivity value of 0.4049 feet per day (ft/day) and a calculated transmissivity value of 51.37 gallons per day per foot (gal/day/ft). In addition, groundwater velocity at the site was calculated to be 0.0621 feet per day (ft/day), or 22.67 feet per year (ft/yr).

During SCR activities, measurable free product thicknesses were observed within monitoring wells MW01, MW02, and MW03. Table 4 included in Appendix A, Page 22 is a summary of the free product thicknesses. In an effort to reduce the observed free phase petroleum, six vacuum truck recovery events were performed at the property during the SCR phase of work and approximately 1,759 gallons of free product and highly concentrated dissolved phase petroleum contamination were recovered. Further, as part of the SCR phase of investigation, Greene collected a sample of the free product within monitoring well MW02. The product sample was submitted for paraffins, isoparaffins, aromatics, naphthenes, and olefins (PIANO) analysis including benzene, toluene, ethylbenzene, xylenes (BTEX), methyl tert-butyl ether (MTBE), ethyl tert-butyl ether (ETBE), tert-Amyl methyl ether (TAME), diisopropyl ether (DIPE), and tert-Amyl alcohol (TAA), as well as a product identification narrative (PIN). Laboratory analysis of the free product sample collected from MW02 confirmed that the product is a gasoline range hydrocarbon. The free product sample maintained a specific gravity of 0.7439 and a calculated octane of 89.530, which likely indicates the product is/was premium gasoline. As documented in the IAMR dated January 24, 2014, a cluster of small holes was observed on the bottom of the former premium UST towards the east end of the tank. In addition, the analytical results yielded

the MTBE percentage by weight (wt %) of the sample to be 0.02. Table 5 included in Appendix A, Page 29 is a summary of the free product analytical results.

Due to the presence of free product, groundwater samples were not collected from monitoring wells MW01-MW03; however, groundwater samples collected from MW04, MW05, and MW06 confirmed the presence of dissolved phase petroleum contamination in the groundwater. The locations of the monitoring wells are included on the Monitoring Well Location Map provided in Appendix B. Table 6 included in Appendix A, Page 30 is a summary of the monitoring well dissolved phase analytical results.

Greene performed a ¼-mile radius receptor survey to identify potential receptors to the confirmed petroleum contamination. Table 7 included in Appendix A, Page 32 is a summary of the ¼-mile radius receptor survey results. As part of the receptor survey and follow-up SCR activities, Greene collected drinking water samples from receptor locations DW01, DW02, DW03, DW07/DW08, DW09, DW10, DW11, DW12, DW13, DW14, DW15, DW16, DW17, DW18, and DW19. Drinking water samples collected from the offsite receptor locations DW02 (Poor Farmer's Market), DW03 (Jane's Country Café), DW12 (Spangler Residence), and DW15 (Nancy's Candy Company) yielded measurable dissolved phase petroleum contamination. The locations of the potential receptors are included on the Potential Receptors Location Map provided in Appendix B. Table 8 included in Appendix A, Page 34 is a summary of the drinking water dissolved phase analytical results. In an effort to mitigate concern associated with the confirmed impact to potable water, carbon filtration units were installed as part of the VA DEQ alternate water supply (AWS) program at receptor locations DW02, DW03, DW12, and DW15. Subsequent to completion of the site characterization phase of work, a copy of the SCR dated April 18, 2014 was submitted to the VA DEQ.

3.3 Site Characterization Report Addendum

Based on the findings of the SCR, the VA DEQ requested SCR Addendum (SCRA) activities be performed at the Meadows of Dan Food Market property. During the SCRA phase of work Greene installed 14 soil borings (B01A, B07-B19) and converted the soil borings to monitoring wells MW01A, MW07-MW19. Monitoring well MW01A was installed as a replacement for MW01, which was abandoned following its being damaged during attempted well manipulation activities. Further, Greene performed additional aquifer characterization and sampling activities. Analytical results of the submitted soil samples yielded evidence of elevated residual phase petroleum contamination at soil boring locations B12 and B15. Limited residual phase contamination was also observed at soil boring locations B07, B10, B13, B14, B18, and B19. As before, the residual phase contamination was primarily observed proximal to or within the smear zone at each boring location. However, very limited residual phase contamination was observed 12-16 feet bgs at boring B18 and 8-12 feet bgs at

borings B07 and B12. Further, very limited residual phase contamination was observed 4-8 feet bgs at soil borings B14 and B15 located proximal to the gasoline dispensers. Soil samples collected from soil borings B08, B09, B11, B16, and B17 did not yield any evidence of residual phase petroleum contamination. The locations of the soil borings are included on the Soil Boring Location Map provided in Appendix B. Table 2 included in Appendix A, Page 3 is a summary of the soil boring residual phase analytical results. Monitoring well construction diagrams are included on the Soil Boring Logs provided as Appendix C.

Subsequent to installation of the groundwater monitoring wells, Greene performed additional aquifer characterization activities. A potentiometric surface map generated from the relative elevations of equilibrated groundwater measured during SCRA activities depicted a primarily southeast hydraulic gradient. However, based on the free phase petroleum plume map and the Isoconcentration maps generated during the SCRA phase of investigation, groundwater flow appears to be primarily to the southwest, which is contrary to the observed hydraulic gradient to the southeast. It is likely groundwater flow and free phase migration is affected by the anisotropic condition discussed in Section 2.3 and if so, groundwater flow would be primarily to the southwest. As discussed in Section 2.3 of this report, this is likely due to the schistose bedrock, which gives rise to micaceous soils with relict structure that retain the northeast-southwest orientations. Table 3 included in Appendix A, Page 9 is a summary of the groundwater elevation data. A potentiometric surface map generated from the relative elevations of equilibrated groundwater as measured during SCRA activities is included in Appendix B. Further aquifer characterization included the performance of pump-down rising head tests on monitoring wells MW06, MW17, and MW18. The pump-down tests yielded a calculated average hydraulic conductivity value of 0.8361 ft/day and a calculated transmissivity value of 80.05 gal/day/ft. In addition, groundwater velocity at the site was calculated to be 0.0942 feet per day (ft/day), or 34.38 feet per year (ft/yr). Based on the observed data, limited, worst-case scenario fate and transport modeling indicated the potential for a 1,035 foot dissolved phase plume.

During SCRA activities, measurable free product thicknesses were observed within monitoring wells MW01/MW01A, MW02, MW03, MW07, MW12, MW14, MW15, and MW19. Table 4 included in Appendix A, Page 22 is a summary of the free product thicknesses. A copy of the Free Phase Petroleum Plume Map generated during SCRA activities is included in Appendix B. In an effort to reduce the observed free phase petroleum, 10 vacuum truck recovery events were performed at the property during the SCRA phase of work and approximately 2,625 gallons of free product and highly concentrated dissolved phase petroleum contamination were recovered. Groundwater samples collected from the 19 monitoring wells confirmed the presence of onsite and offsite dissolved phase petroleum contamination in the shallow groundwater. The locations of the monitoring wells are included on the Monitoring Well Location Map provided in Appendix B.

Table 6 included in Appendix A, Page 30 is a summary of the monitoring well dissolved phase analytical results. Analytical results of drinking water samples collected from receptor locations DW01, DW07/DW08, DW13, DW14, DW16, and DW19 yielded Non Detected for all analytes. However, pre-filtration drinking water samples continued to yield the presence of petroleum contamination at receptor locations DW02, DW03, DW12, and DW15. Table 8 included in Appendix A, Page 34 is a summary of the drinking water dissolved phase analytical results. Copies of the Isoconcentration maps generated during SCRA activities for TPH-GRO, TPH-DRO, BTEX, MTBE, naphthalene, and total BTEX are provided in Appendix B. Subsequent to completion of the site characterization addendum phase of work, a copy of the SCRA dated July 11, 2014 was submitted to the VA DEQ.

3.4 Interim Authorization Corrective Action Plan Implementation

Based on the findings of the SCRA and the previously performed phases of work, Greene determined corrective action would be required at the Meadows of Dan Food Market. As a result, Greene requested to perform Corrective Action Plan Implementation (CAP IMP) activities under Interim Authorization (IA) prior to full completion of site characterization in a letter dated June 5, 2014. In a letter dated June 11, 2014, the VA DEQ authorized the performance of IA CAP IMP activities at the subject site. A summary of the additional site characterization, well modifications and trenching, and pilot study activities performed during the IA CAP IMP phase of work are included in the following sections. Subsequent to completion of the IA CAP IMP phase of work, a copy of the report dated February 13, 2015 was submitted to the VA DEQ.

3.4.1 IA CAP IMP Site Characterization

In an effort to complete characterization of the free phase plume, Greene installed nine additional soil borings (B020-B28) and converted the soil borings to monitoring wells MW20-MW28. Analytical results of the submitted soil samples yielded evidence of elevated residual phase petroleum contamination at soil boring locations B21, B25, and B28. Limited residual phase contamination also was observed at soil boring locations B22, B23, B24, B26, and B27. The residual phase contamination was primarily observed proximal to or within the smear zone at each boring location. However, very limited residual phase contamination was observed from approximately 5-35 feet bgs at soil boring B25 located proximal to the kerosene/gasoline dispensers. Soil samples collected from soil boring B20 did not yield any evidence of residual phase petroleum contamination. The locations of the soil borings are included on the Soil Boring Location Map provided in Appendix B. Table 2 included in Appendix A, Page 3 is a summary of the soil boring residual phase analytical results. Monitoring well construction diagrams are included on the Soil Boring Logs provided as Appendix C.

Subsequent to installation of the groundwater monitoring wells, Greene performed additional aquifer characterization activities. A potentiometric surface map generated from the relative elevations of equilibrated groundwater measured during IA CAP IMP activities depicted a primarily southeast hydraulic gradient. However, based on the free phase petroleum plume maps and the Isoconcentration maps generated during the IA CAP IMP phase of investigation, free product movement appears to be primarily to the southwest, which is contrary to the observed hydraulic gradient to the southeast. It is likely groundwater flow and free phase migration is affected by the anisotropic condition discussed in Section 2.3 and if so, groundwater flow would be primarily to the southwest. As discussed in Section 2.3 this is likely due to the schistose bedrock, which gives rise to micaceous soils with relict structure that retain the northeast-southwest orientations. Table 3 included in Appendix A, Page 9 is a summary of the groundwater elevation data. A potentiometric surface map generated from the relative elevations of equilibrated groundwater as measured during IA CAP IMP activities is included in Appendix B.

During the IA CAP IMP phase of work, free phase plume mapping indicated a free product plume extending northeast-southwest approximately 200 feet. In addition, measurable free product thicknesses were observed within 15 (MW01A, MW02, MW03, MW07, MW12, MW14, MW15, MW19, MW21, MW22, MW23, MW24, MW25, MW26, and MW28) of the 28 monitoring wells. A copy of the Free Phase Petroleum Plume Map generated during SCRA activities is included in Appendix B. In an effort to reduce the observed free phase petroleum, six vacuum truck recovery events were performed at the property during the IA CAP IMP phase of work and approximately 1,337 gallons of free product and highly concentrated dissolved phase petroleum contamination were recovered. Groundwater samples collected from the 28 monitoring wells confirmed the presence of onsite and offsite dissolved phase petroleum contamination in the shallow groundwater. Analytical results of groundwater samples collected from the monitoring wells yielding evidence of free product during the IA CAP IMP phase of investigation (MW01A, MW02, MW03, MW12, MW14, MW15, MW19, MW21-MW26, and MW28) yielded measurable TPH-GRO, BTEX, and MTBE concentrations. In addition, laboratory results from the wells with free product, except for MW02, yielded measureable naphthalene concentrations. Analytical results of the groundwater samples collected from the hydraulically downgradient monitoring wells, MW04 and MW05, yielded measurable concentrations of TPH-GRO, TPH-diesel range organics (DRO), BTEX, and MTBE. In addition, laboratory results from MW05 yielded a measureable naphthalene concentration. The groundwater sample collected from the onsite hydraulically upgradient monitoring well, MW06, yielded TPH-GRO, BTEX, and MTBE concentrations. The groundwater samples collected from the offsite monitoring wells MW13 and MW16 yielded measurable MTBE concentrations. The groundwater samples collected from the offsite monitoring wells MW10 and MW20 yielded limited TPH-GRO and MTBE concentrations. Analytical results from MW11 yielded limited

benzene, toluene, and MTBE concentrations. Groundwater samples collected from the offsite monitoring wells MW08, MW09, MW17, and MW18 yielded Non Detected for all analytes at laboratory method detection limits. The locations of the monitoring wells are included on the Monitoring Well Location Map provided in Appendix B. Table 6 included in Appendix A, Page 30 is a summary of the monitoring well dissolved phase analytical results.

Analytical results of drinking water samples collected from receptor IDs DW01, DW07/DW08, DW13, DW14, DW16, MW17, and DW19 yielded Non Detected for all analytes at laboratory method detection limits. However, pre-filtration drinking water samples continued to yield the presence of petroleum contamination at receptor IDs DW02, DW03, DW12, and DW15. Copies of the Isoconcentration maps generated during SCRA activities for TPH-GRO, TPH-DRO, BTEX, MTBE, naphthalene, and total BTEX are provided in Appendix B. Table 8 included in Appendix A, Page 34 is a summary of the drinking water dissolved phase analytical results.

3.4.2 IA CAP IMP Well Modifications & Trenching Activities

As part of IA CAP IMP activities, Greene prepared the site for long term utilization of remediation technology to address the observed petroleum contamination observed both onsite and offsite. Greene selected 16 monitoring wells to be utilized as remediation system extraction wells at the facility. Monitoring wells MW01A, MW02, MW03, MW07, MW12, MW14, MW15, MW19, MW21-26, and MW28 were selected due to free product being observed within them. In addition, monitoring well MW27, which had never been found to contain observable free product, also was selected to be utilized as an extraction well in order to reduce the migration of the petroleum plume offsite. In an effort to reduce the day-to-day impact to the retail facility, dedicated 2" schedule 40 PVC piping was installed from monitoring wells MW01A, MW02, MW03, MW07, MW12, MW14, MW15, MW19, and MW21-MW28 in a series of shallow trenches to a 24" x 24" steel vault located in a grassy/gravel area on the north side of the property. In addition, the well covers for MW01A, MW02, MW03, MW07, MW12, MW14, MW15, MW19, and MW21-MW28 were removed and replaced with 24" x 24" steel vaults to allow for connection of the PVC piping to the well heads including the installation of the appropriate in-line metering and adjustment equipment. The steel vaults were set in concrete and resurfaced with concrete pads in an effort to eliminate shifting or settling due to the significant vehicle traffic at the facility. Approximate locations of the 24" x 24" vaults and the remediation trenching are provided on the Remediation System Groundwork Map included in Appendix B.

Following the completion of subsurface activities, Greene contracted C J Asphalt Paving, Inc. (C J Asphalt) of Boones Mill, VA to perform resurfacing of the areas disturbed during exaction activities. In addition, the

sections of trench installed within concrete also were resurfaced and Greene installed two steel U-bollards proximal to the 24" x 24" steel vault where the PVC pipes were terminated. Greene then installed the necessary piping, valves, and gauges within the well vaults between the well heads and the subsurface PVC piping. Greene reduced the 2" schedule 40 PVC piping to 1" schedule 80 PVC piping to allow for the installation of an in-line ball valve, vacuum gauge, and sample port, as well as the necessary fittings between the subsurface piping and the well head. The ball valve, vacuum gauge, and sample port will be utilized to make adjustments during remediation system operation. In addition, the sample port also will be utilized to obtain magnehelic readings during system operation. Subsequent to installation of the vault plumbing, Greene installed 1" schedule 40 PVC piping within the wells to aid in recovery of liquid and vapor during remediation activities.

3.4.3 IA CAP IMP Dual-Phase Extraction Pilot Study Event Summary

Based on the perceived effectiveness of numerous vacuum truck recovery events performed at the Meadows of Dan Food Market facility, Greene selected Dual-Phase Extraction (DPE) as the remediation technology to be utilized to conduct a 14-Day Pilot Study Event. The pilot study was conducted in an effort to determine the feasibility of utilizing DPE as a remediation technology for recovering gasoline contamination at the subject site. The pilot study was separated into two phases; an eight day individual well pilot study event and a six day multiple well pilot study event. The individual well phase of the pilot study was performed in order to collect well specific recovery data, and the multiple well phase of the pilot study was performed in order to collect data more representative of the anticipated long term remediation effort.

Throughout the 14-Day DPE Pilot Study Event, Greene performed monitoring of the remediation system components and the associated monitoring/recovery wells. Approximately once per hour while onsite, Greene documented the following:

- the rotary claw pump (RCP) vacuum from a gauge located on the vapor/liquid separator
- the temperature of the RCP vapor exhaust stream from a gauge installed in the vapor discharge piping
- the pressure differential utilizing pitot tubes installed in both the RCP influent and effluent vapor streams
- the RCP effluent VOC vapors from a sample port installed in the exhaust piping utilizing a PID
- the bag filter pressures from gauges installed pre-filter and post-filter
- the air stripper blower pressure from a gauge installed at the blower
- the air stripper pressure utilizing a magnehelic gauge
- the air stripper effluent VOC vapors from a sample port installed in the exhaust piping utilizing a PID
- the vacuum of the extraction well(s) at the remediation system manifold

- the vacuum of the extraction well(s) from the gauge(s) installed within the well vault(s)
- the vacuum of associated monitoring wells utilizing magnehelic gauges
- the volume of liquids discharged

In addition to data collection, Greene collected multiple vapor samples from the RCP and air stripper effluent streams, as well as influent and effluent water samples during the pilot study event. The vapor samples were collected from sample ports installed in the RCP and air stripper effluent piping. The air stripper vapor samples and PID readings were only obtained while water was being transferred from the oil/water separator into the air stripper. The water influent samples were collected from a sample port located along the piping that transfers water from the oil/water separator to the air stripper. The effluent water samples were collected from a sample port located on the piping that discharges water from the air stripper to the storage tanker.

The DPE remediation system operated for a total of 318.5 hours during the 14-Day Pilot Study Event and recovered a total of 27,838 gallons of free product and groundwater. In addition, an estimated total of 4,355.20 pounds of hydrocarbon contamination was recovered in the vapor phase and an estimated total of 19.38 pounds of hydrocarbon contamination was recovered in the dissolved phase during the 14-Day Pilot Study Event. It should be noted that no dissolved phase analytical data was obtained during the individual well phase of the pilot study. Approximately 50-gallons of free phase petroleum were recovered during the event. A summary of the individual well phase and the multiple well phase of the pilot study event is provided in the following sections.

3.4.3.1 IA CAP IMP Individual Well Pilot Study Event Summary

In order to collect well specific recovery data, the DPE remediation system was individually connected to monitoring wells MW21, MW03, MW28, MW26, MW22, MW02, MW14, and MW23. The DPE remediation system operated for a total of 173 hours during the individual well phase of the pilot study event and a total 8,010 gallons of free product and petroleum impacted groundwater were recovered, transported and disposed. An estimated total of 2,187.91 pounds of hydrocarbon contamination was recovered in the vapor phase during the individual well phase of the 14-Day Pilot Study Event based on average total volatile petroleum hydrocarbon (TVPH) concentration and a calculated vapor phase recovery volume. In addition, approximately 25-gallons of free phase petroleum were recovered during the individual phase of the pilot study. Throughout the entire individual well phase of the pilot study significant areas of influence and groundwater drawdown were observed likely indicating acceptable communication throughout the subsurface soils. It should be noted that groundwater drawdown and vacuum influence observations made during this portion of the pilot study indicate a significant communication preference along a northeast-southwest orientation. This preference and

its orientation is thought to further confirm the expected influence of the relict soil structure on the groundwater flow and likely indicates a similar influence of air flow.

3.4.3.2 IA CAP IMP Multiple Well Pilot Study Event Summary

In order to collect data more representative of the anticipated long term remediation effort, Greene connected the DPE remediation system to multiple monitoring wells. Greene determined that monitoring wells MW01A, MW02, MW03, MW14, MW24, MW25, and MW26 would be utilized as extraction points during the multiple well phase of the pilot study event. The DPE remediation system operated for a total of 145.5 hours during the multiple well phase of the pilot study event and a total of 19,828 gallons of free product and petroleum impacted groundwater were recovered, transported and disposed. An estimated total of 2,167.29 pounds of hydrocarbon contamination was recovered in the vapor phase during the multiple well phase of the 14-Day Pilot Study Event based on average TVPH concentration and a calculated vapor phase recovery volume. In addition, approximately 25-gallons of free phase petroleum were recovered during the multiple well phase of the pilot study. Further, an estimated total of 19.38 pounds of hydrocarbon contamination was recovered in the dissolved phase as calculated based on average influent TPH-GRO concentration and the adjusted liquid phase recovery volume. Throughout the entire multiple well phase of the pilot study significant areas of influence and groundwater drawdown were observed likely indicating acceptable communication throughout the subsurface soils. As with the individual well phase of the pilot study, groundwater drawdown and vacuum influence observations made during the multiple well phase of the pilot study also indicate a significant communication preference along a northeast-southwest orientation. This preference and its orientation is thought to further confirm the expected influence of the relict soil structure on the groundwater flow and likely indicates a similar influence of air flow.

3.5 Corrective Action Plan Request

As stated in Section 1.0 of this report, based on review of the IA CAP IMP report, the VA DEQ requested the development of a Corrective Action Plan for the remediation of free phase petroleum at the Meadows of Dan Food Market facility. A copy of the VA DEQ request letter dated March 19, 2015 is included in Appendix J of this report.

4.0 Additional Site Characterization Activities

During CAP development activities, Greene obtained access to the Janie Stidham Property (receptor ID DW04) to collect a drinking water sample from the onsite supply well. On March 30, 2015, Greene collected a drinking water sample from the water supply reportedly providing potable water to the DW04, DW05, and DW06 receptor locations. The drinking water sample (DW04) was collected from a bathroom faucet located in

the DW04 building subsequent to allowing the water to flow for approximately 10 minutes. Clean, disposable nitrile gloves were used during all phases of sample collection. The water sample was collected in glass sampling bottles, placed inside a cooler on ice, entered onto a chain of custody document, and delivered to REI Consultants, Inc. (REIC) of Beaver, WV. The supply well sample was submitted for VOCs analysis via EPA method 8260B and for semi-volatile organic compounds analysis (SVOCs) via EPA method 8270C. Copies of the laboratory results and chain of custody documentation are included in Appendix D.

Analytical results of the drinking water sample collected from the water supply reportedly providing potable water to receptor locations DW04, DW05, and DW06 yielded evidence of dissolved phase petroleum contamination. The drinking water sample collected from the DW04 supply well yielded benzene, xylenes, MTBE, and naphthalene concentrations 21.9 micrograms per liter ($\mu\text{g/L}$), 26.9 $\mu\text{g/L}$, 47.6 $\mu\text{g/L}$, and 1.81 $\mu\text{g/L}$, respectively. Upon receiving these results on April 9, 2015, attempts were made to contact the property owners/agents of receptor IDs DW04 (Janie Stidham Property), DW05 (Former Dan River Books), and DW06 (Cassell Farms Property); however, DW05 and DW06 property owners were unable to be reached at this time. Greene reported the impact of petroleum in the drinking water well to the VA DEQ on April 9, 2015.

On April 20, 2015, Greene resampled the drinking water well located at receptor location DW04. As before, drinking water sample DW04 was collected from the bathroom faucet located within the Janie Stidham Property subsequent to allowing the water to flow for approximately 10 minutes. Clean, disposable nitrile gloves were used during all phases of sample collection. The water sample was collected in glass sampling bottles, placed inside a cooler on ice, entered onto a chain of custody document, and delivered to REIC of Beaver, WV. The supply well sample was submitted for VOCs analysis via EPA method 8260B and for SVOCs via EPA method 8270C. Copies of the laboratory results and chain of custody documentation are included in Appendix D. Analytical results of the drinking water sample collected on April 20, 2015 confirmed the presence of dissolved phase contamination in the water supply reportedly providing potable water to receptor locations DW04, DW05, and DW06. The drinking water sample collected from the DW04 supply well yielded benzene, xylenes, and MTBE concentrations 16.0 $\mu\text{g/L}$, 24.3 $\mu\text{g/L}$, and 34.9 $\mu\text{g/L}$, respectively. Table 8 included in Appendix A, Page 34 is a summary of the drinking water dissolved phase analytical results.

Subsequent to obtaining confirmation of petroleum impact to the drinking water, the VA DEQ was notified of the supply well sampling result. In addition, attempts were again made to contact the property owners/agents of the DW04, DW05, and DW06 properties; however, the DW05 and DW06 property owners were unable to be reached immediately upon receiving the laboratory analytical results. During CAP development activities,

the only property reportedly occupied was the Cassell Farms Property (DW06). On April 25, 2015, Greene was able to contact the property owner and tenant. They were informed that initially they would be provided with bottled water and would be reimbursed for potable water they purchased to be utilized at the property. On April 25, 2015, five cases of potable water were delivered to the DW06 property. Greene personnel also informed the property owner/agent for the DW04 property that an AWS referral form would be completed and VA DEQ AWS program personnel should be contacting them to schedule the installation of carbon filtration units (CFU). On May 27, 2015 a VA DEQ AWS program approved contractor installed the CFU system at the Janie Stidham Property (DW04).

As part of the CFU system installation and maintenance activities pre-treatment drinking water samples are routinely collected. Analytical results of the drinking water samples collected on behalf of the VA DEQ AWS program also yielded measurable levels of dissolved phase contamination. Greene obtained the analytical results collected on behalf of the VA DEQ AWS program included in this report from Mr. Harmon Fisher with the VA DEQ AWS program. Copies of the laboratory results and chain of custody documentation for the samples collected on behalf of the VA DEQ AWS program are not included in this report and any request for this documentation should be made to the VA DEQ AWS program. Table 8 included in Appendix A, Page 34 is a summary of the drinking water dissolved phase analytical results.

In addition to collecting the drinking water sample on April 20, 2015, Greene performed an investigation of the supply well system located at the DW04 property in an attempt to confirm which properties were receiving potable water from the Janie Stidham Property. On April 20, 2015, Greene was unable to confirm that the supply well located on DW04 provided potable water to the DW05 or DW06 properties; however, Greene did confirm that the Jane's County Café was utilizing water obtained from the DW04 supply well. Based on these findings, Greene returned to the subject site on April 25, 2015 to meet with a contractor for the Jane's County Café. The water supply from the DW04 property was turned off, and Greene confirmed that the supply well located at the Jane's County Café (DW03) was not supplying potable water to the café at that time. However, while the water supply from DW04 was turned off, the contractor determined that the pressure switch for the Jane's County Café (DW03) supply well was not working properly. The pressure switch was manually bypassed and the contractor was able to confirm that the well pump within the supply well located at the Jane's County Café would function properly if a new pressure switch was installed. As a result of the damaged pressure switch, the water supply from the Janie Stidham Property was turned on and allowed to provide potable water to the café until the repairs could be made. Further, on April 25, 2015 Greene met with the DW06 property owner and was able to confirm the DW04 supply well provides potable water to the Cassell Farms Property (DW06).

Subsequent to the installation of a new pressure switch for the Jane's County Café (DW03) supply well system, Greene returned to the site on April 30, 2015 to collect a water sample from the DW03 well. Upon arrival, Greene turned off the water supply from the DW04 property and allowed the water from the Jane's County Café supply well to flow for approximately 40 minutes prior to sample collection. The drinking water sample from the DW03 supply well was collected from an inside faucet subsequent to bypassing the AWS carbon filtration system. Clean, disposable nitrile gloves were used during all phases of sample collection. The water sample was collected in glass sampling bottles, placed inside a cooler on ice, entered onto a chain of custody document, and delivered to REIC of Beaver, WV. The supply well sample was submitted for VOCs analysis via EPA method 8260B and for SVOCs via EPA method 8270C. Copies of the laboratory results and chain of custody documentation are included in Appendix D. Subsequent to collecting the drinking water sample, the AWS carbon treatment system was reconnected. Due to the AWS system having been installed based on water characteristics and analytical results likely from the DW04 supply well, Greene turned off the breaker for the Jane's County Café (DW03) supply well and opened the valve to allow drinking water from the Janie Stidham Property (DW04) water well to provide potable water to Jane's County Café. Analytical results of the drinking water sample collected on April 30, 2015 from the DW03 supply well yielded Non Detected for petroleum constituents. Table 8 included in Appendix A, Page 34 is a summary of the drinking water dissolved phase analytical results.

On May 12, 2015, Greene personnel returned to the subject site to collect a DW03 supply well confirmation sample. Upon arrival, Greene turned off the water supply from the DW04 property and allowed the water from the Jane's County Café supply well to flow for approximately 35 minutes prior to sample collection. The drinking water sample from the DW03 supply well was sampled from a spigot located at the pressure tank prior to the carbon filtration system. Clean, disposable nitrile gloves were used during all phases of sample collection. The water sample was collected in glass sampling bottles, placed inside a cooler on ice, entered onto a chain of custody document, and delivered to REIC of Beaver, WV. The supply well sample was submitted for VOCs analysis via EPA method 8260B and for SVOCs via EPA method 8270C. Copies of the laboratory results and chain of custody documentation are included in Appendix D. As before, subsequent to collecting the drinking water sample, Greene turned off the breaker for the Jane's County Café (DW03) supply well and opened the valve to allow drinking water from the Janie Stidham Property (DW04) water well to provide potable water to Jane's County Café. Analytical results of the drinking water sample collected on May 12, 2015 from the DW03 supply well yielded Non Detected for petroleum constituents. Table 8 included in Appendix A, Page 34 is a summary of the drinking water dissolved phase analytical results.

In addition, Greene personal met with the owner of the Former Dan River Books property (DW05) on May 12, 2015. The property owner reported that the building had been winterized and the water supply to the building had been turned off for approximately two years. During site activities, on May 12, 2015 Greene was able to confirm that the drinking water supply well located on the DW04 property provides potable water to the DW05 property. Greene informed the property owner that they would be provided with bottled water and would be reimbursed for potable water they purchased to be utilized at the property if the building was to be occupied. Further, Greene informed the property owner that a carbon filtration system should be installed at the DW04 property. As mentioned previously, a VA DEQ AWS program approved contractor installed the CFU system at the Janie Stidham Property (DW04) on May 27, 2015.

Finally, Greene spoke with a contractor for Jane's Country Café. He stated that a new pressure switch had been installed on May 28, 2015 and that the Jane's Country Café was obtaining drinking water from the supply well located on the café property (DW03). In addition, he stated that he had spoken with the VA DEQ AWS contractor and informed him the water supply from the Janie Stidham Property (DW04) had been turned off to the Jane's Country Café property.

5.0 Remediation Assessment

As part of CAP preparation, Greene evaluated various remediation technologies which would restore the subject site to conditions that satisfy the VA DEQ's stated endpoint of <0.01 feet of measurable free product thickness. The following sections outline applicable remediation technologies that are commonly implemented at petroleum impacted sites that warrant corrective action measures.

5.1 Description of Remediation Alternatives

5.1.1 Soil Vapor Extraction with In Situ Air Sparging

Vapor extraction refers to the technique of removing contaminant vapors from the unsaturated zone by means of active or passive venting. A network of extraction points is installed either vertically or horizontally within the contaminated zone and manifolded to a surface discharge point. Extracted vapors either are vented directly to the atmosphere or to an off-gas treatment unit. The need for off-gas treatment likely is a function of site-specific conditions and local regulatory emission standards. Active vapor extraction has proven to expedite remediation of free- and dissolved-phase contamination as well. The decreased pore pressure within the unsaturated zone created by the induced vacuum increases the volatilization of contaminants within the respective plumes below.

Sparging has been used successfully to expedite remediation through vapor extraction. Sparging involves the injection of air into the subsurface through a series of injection points. The introduction of clean air increases the rate of pore volume exchange between clean air and the subgrade contaminant vapor. A greater percentage of contaminant vapor can then be extracted using a vapor extraction system. Groundwater sparging, the introduction of clean air into the phreatic zone, has been used with great success in expediting the remediation of dissolved-phase contaminant plumes. Greatest efficiency has been documented through the use of groundwater sparging in association with vapor extraction systems. Remediation system design will require modifications to address the presence of voids/fractures. A comprehensive, tabular summary of this remediation approach is presented in Table 9 included in Appendix A, Page 38.

5.1.2 Groundwater Pump & Treat

Groundwater pump and treat technology involves extracting contaminated groundwater for treatment at the surface. A network of groundwater recovery wells is installed, depending upon site specific conditions and hydrogeologic considerations. Groundwater is recovered from the extraction points through systematic pumping. Once at the surface, the extracted liquids can be treated on-site using various remediation components or transported off-site for treatment and disposal. On-site treatment methods may include activated carbon filtration, residence in a bioreactor, air stripping, etc. As in the case of vapor extraction, the use of an air stripper may require off-gas permitting. Further permitting may be required by the local regulatory agency for the discharge of the treated waste stream. A comprehensive, tabular summary of this remediation approach is presented in Table 10 included in Appendix A, Page 38.

5.1.3 In Situ Bioremediation

In situ bioremediation involves a process where oxygen and nutrients are introduced to the unsaturated zone through well points or an infiltration gallery to promote contaminant degradation by naturally-occurring organisms. Commercially available bacteria also may be employed where the indigenous population is insufficient. The effectiveness of bioremediation is a function of various physical properties of the subsurface environment and the contaminants, though it is proven effective in most settings impacted by petroleum hydrocarbons. This process allows for treatment of contaminated groundwater in-place, eliminating the requirement for pumping and the subsequent treatment of extracted groundwater. Treatment time may vary significantly, generally ranging from six months to four years. A comprehensive, tabular summary of this remediation approach is presented in Table 11 included in Appendix A, Page 39.

5.1.4 Dual-Phase Extraction

Residual phase, dissolved phase, and free phase petroleum compounds have been demonstrated by industry to effectively be removed using dual-phase extraction technology. A rotary-claw vacuum pump removes liquid- and vapor-phase contaminants from recovery wells or trenches. Aboveground treatment is dependent on the nature of the effluent waste stream, but typically it involves the mechanical separation of vapors, free-phase petroleum, and groundwater, removal of dissolved-phase compounds from groundwater via stripping and carbon filtration, and discharge of treated groundwater under applicable permit authority. Vapors may be emitted to the atmosphere without treatment if calculated emission rates are below permit threshold limits. Dual-phase systems have proven to be effective in attaining remediation endpoints within one to four years. A comprehensive, tabular summary of this remediation approach is presented in Table 12 included in Appendix A, Page 39.

In some cases, short-term removal using a mobile dual-phase extraction and treatment system can be effective in recovering significant contaminant mass and reducing the long-term impact of petroleum releases. When performed as a feasibility study prior to issuance of a Corrective Action Plan (CAP), a 72-hour removal event typically costs approximately \$15,000. Observed site conditions and quantitative data compiled to date suggest that episodic, mobile recovery is not the most cost effective means to achieve cleanup goals within a reasonable timeframe. The presence of dissolved phase petroleum in offsite water supplies and the significant free phase petroleum plume extending over 200 feet do not facilitate natural attenuation of the identified contaminants. Periodic or passive remediation will not adequately address the existing problem. The identified impacts and the continued potential risk to human health and the environmental warrant aggressive corrective action measures. However, prior to installation of the long-term treatment system, episodic vacuum truck recovery events will likely reduce the further migration of the free phase petroleum plume and allow for limited removal of impacted groundwater and free product.

5.1.5 Spray Aeration Vapor Extraction

As requested by VA DEQ personnel, Greene also evaluated Spray Aeration Vacuum Extraction (SAVE) as a potential remediation technology to be implemented at the Meadows of Dan Food Market facility. The SAVE system utilizes an internal combustion engine (ICE) to generate a vacuum that is applied to the subsurface to remove the petroleum hydrocarbons through air stripping principles. Recovered liquids pass through a spray nozzle that maximizes the surface area between the recovered liquids and air, which allows for enhanced air stripping. In addition, the heat generated from the internal combustion engine increases the temperature of the recovered liquids, and when combined with the increased pressure from the vacuum generated by the ICE the movement of petroleum contaminations into vapor is optimized. Further, recovered petroleum contaminants

can be utilized as a power supply for the ICE with propane being supplemented as needed based on contaminant recovery and subsurface conditions. Since free product is burned as fuel an Oil Water Separator is not needed. The spray aeration treatment system has similar efficiency to a traditional tray air stripper for removing BTEX constituents; however, because it uses heat enhancement MTBE treatment efficiency is improved by as much as 25-30%. A comprehensive, tabular summary of this remediation approach is presented in Table 13 included in Appendix A, Page 40.

5.2 Remediation Technologies Summary & Recommendations

Based on the presence of a free phase petroleum plume extending over 200 feet and containing an estimated 13,263 gallons of free product (further discussed in Section 7.4) and the presence of petroleum impacted water supplies, the selected remediation system must: (1) reduce and/or eliminate the migration of the free phase plume, (2) reduce the potential for additional free product formation, and (3) achieve the remediation endpoint of <0.01 feet of free product in an efficient, cost effective, and timely manner. Greene considered air sparging with soil vapor extraction, groundwater pump and treat, in-situ bioremediation, dual-phase extraction, and spray aeration vacuum extraction technologies for the Meadows of Dan Food Market facility. Due to the elevated free product thickness and the size of the free phase plume, air sparging and in-situ bioremediation will be ineffective at reducing the free product plume, preventing the formation of new free product, and at achieving remediation endpoints.

SVE remediation would be effective at removing the free phase petroleum mass; however, that lack of groundwater recovery will not sufficiently reduce or eliminate the migration of the free phase petroleum plume. In addition, the lack of groundwater recovery also limits the amount of contamination recovered from soils located within the smear zone. SVE remediation relies upon natural groundwater fluctuations to allow for the extraction of contaminants in the soils located within or proximal to the smear zone. A groundwater pump and treat remediation system would reduce and/or prevent the migration of the free phase petroleum plume by creating a cone of depression around the extraction wells; however, recovery of petroleum contamination from the exposed and the exposed newly soils would be limited without vacuum extraction. Greene considered utilizing a groundwater pump and treat system in addition to SVE; however, implementing two types of remediation technologies, when vacuum truck recovery/pilot study events have proven reliable at recovering both vapors and liquids at the site, is not practical or cost effective.

Spray aeration vacuum extraction and dual-phase extraction technologies both recover vapor and liquid phases from the subsurface, and based on the pilot study both technologies would be effective at obtaining the remediation objectives and endpoint. A more comprehensive comparison between the two technologies

including site specific advantages and disadvantages, as well as the technology recommended for implementation at the Meadows of Dan Food Market is discussed below.

The advantage of the SAVE remediation system would be that recovered hydrocarbons could be utilized to provide fuel for the ICE, which would result in a reduction of electricity usage. However, once the influent vapor stream becomes unable to provide enough fuel for the ICE, propane would need to be supplemented. Based on the system data and laboratory results obtained during the pilot study, the influent streams will likely not provide sufficient fuel for the ICE. The ICE system is recommended for sites with high concentrations (100,000 ppm or greater) and low permeability. Pilot study data indicates a significant vacuum loss between the pumps and the recovery wells. This is likely the result of the subsurface characteristics observed at the site where the relict structure of the rocks is preserved in the residual soils. In fact, a radius of influence exceeding 100 feet was observed during the pilot study. The observed vacuum loss indicates additional air from the subsurface is being incorporated into the vapor stream, which in turn yields reduced vapor concentrations. The average TVPH concentration in the vapor samples collected during the pilot study were approximately 35,000 ppm and 15,000 ppm, during the individual and multiple well phases of the pilot study, respectively. As a result, the SAVE remediation system would require a significant amount of supplemental propane to operate. Subsequent to completing the remediation assessment of the ICE/SAVE system Greene does not recommend the installation of this technology at the Meadows of Dan Food Market facility. A summary of the reasons Greene does not recommend the ICE/SAVE remediation system is provided below:

- 1) The pilot study determined that a flow rate of 575 ACFM or 305 SCFM is required for the site. This would require three average ICE units. With a budget cost of \$80,000 to \$100,000 each the initial capital cost would be \$240,000 to \$300,000.
- 2) The vapor concentration levels are below the level recommended for efficient operation of the ICE unit and significant levels of propane would be required to supplement operation. The propane cost would likely exceed the cost of electrical service for a dual phase system.
- 3) System operation will require two utilities; propane and electrical.
- 4) The maintenance required to keep the ICE unit in operation exceeds the maintenance required for a traditional dual phase system.
- 5) Because of the surface water discharge point, it is recommended that bag filters and carbon polishing are added to prevent discharge of levels above permit limits. The need for bag filters and carbon units would result in additional capital costs.

In contrast, a traditional DPE unit with water treatment typically operates using a three phase electrical power supply. Costs range from \$800-\$1,500 monthly and vary according to power consumption and electrical rates. In addition, the DPE system does not treat extracted vapors and the vapors are discharged to atmosphere, unless local regulations require secondary treatment. Subsequent to completing the remediation assessment of the DPE system Greene recommends the installation of this technology at the Meadows of Dan Food Market facility. Based on the pilot study, a dual phase system with the inlet flow capacity of 765 ACFM and with 20 GPM with an oversized tray style air stripper and carbon polishing will provide the removal and treatment to meet the discharge limits. The benefits of this design would be:

- 1) The proposed design would incorporate all components necessary to achieve applicable water discharge requirements at an initial capital cost of \$140,000 to \$160,000.
- 2) Spare flow capacity with a parallel blower design that would allow for electricity savings if the flow needed drops.
- 3) The transfer pumps have the flow and pressure needed to pump through the carbon and bag filters and spare capacity to overcome potential fouling.
- 4) The air stripper has additional capacity to help treat the MTBE by increasing retention time and air to water ratio.
- 5) There is capacity for additional wells to be connected if the system operation identifies the need to expand.

As such, Greene recommends the installation of a dual-phase remediation system at the Meadows of Dan Food Market facility. The DPE system will effectively reduce and/or eliminate the migration of the free phase plume, reduce the potential for additional free product formation, and achieve the remediation endpoint of <0.01 feet of free product in an efficient, cost effective, and timely manner.

6.0 Proposed Corrective Action

As stated in the VA DEQ Corrective Action Plan request letter dated March 19, 2015, the CAP will address the free phase petroleum contamination located at the site. Based on the previously performed site characterization activities, the vacuum truck recovery events, and the 14-day pilot study, Greene has identified DPE as the best fit technology for the recovery of the free phase gasoline contamination at the site. Additionally, the use of DPE is expected to significantly reduce the residual and dissolved phases during its implementation, thus reducing the likelihood of future free product formation beneath the site.

6.1 Site Specific Description of Equipment

The DPE system utilized for long term implementation at the Meadows of Dan Food Market facility will be designed to meet the optimal conditions identified during the two week pilot study. Based on the results of the pilot study, the optimum vacuum range for the site is approximately 13.5 to 15.0 inches of mercury. This is demonstrated by the higher flow and higher concentrations achieved at that optimum range. Pilot study data indicates lower vacuums have not yet achieved maximum flow or VOC removal efficiency and higher vacuum creates friction loss that lowers the flow rate and the VOC removal efficiency.

The pilot study was performed using three rotary claw blowers with a combined max flow of 495 ACFM at 0-22" HG. When testing the wells individually there was an average vacuum loss of 29% between the well head vacuum and the system vacuum. Since the blower curve is flat, a corresponding difference in flow is assumed. Dilution air was added to reach the optimum vacuum range. The addition of dilution air lowered the percentage of inlet air flow compared to outlet air flow by 20%. This corresponds with the 20% drop observed in the well head vacuum after the dilution air was introduced to the system. The average total flow per well is 36.06 ACFM ($495 \text{ max ACFM} \times 51\% = 252.45 \text{ ACFM} / 7 \text{ wells} = 36.06 \text{ per well}$). A 16 well full scale implementation would require a minimum operating capacity of 576 ACFM (16 wells x 36.06). The recommended dual phase treatment system would include a 16 point inlet vacuum manifold, a 120 gallon air water separator with a progressive cavity pump and controls, three 10 HP rotary claw blowers piped in parallel (765 ACFM @ 15" Hg), a 20 gpm OWS with a centrifugal pump and controls, two bag filters in series to remove particulate, a 4 tray EZ Tray™ steel air stripper with a centrifugal pump and controls, two additional bag filters in series to remove particulate and keep the carbon from fouling, and two 500 pound liquid granular activated carbon (LGAC) vessels in series. The system controls should have full remote access and alarm notification, along with basic data logging of run time hours, vacuum, pressure, flow and gallons pumped. All of this equipment will be contained within an estimated 8' x 25' enclosed mobile trailer unit. A diagram of the proposed DPE remediation system is provided in Appendix B.

In addition, Greene proposes installing a vapor carbon filtration unit in an effort to reduce the volume of petroleum contamination being released to the atmosphere. Greene anticipates that subsequent to completing the first quarter of system operation the easily available free product, that volume being within the well casings, sand packs, and immediately adjacent soils should be removed. As a result, the vapor discharge volumes should be significantly reduced and the vapor carbon filtration unit will likely be removed. Greene proposes installing a 2,000 pound unit. The anticipated cost for the vapor carbon filtration unit including the carbon, fittings, and hoses is approximately \$7,000.00.

6.2 Proposed Operational Strategy

During IA CAP IMP activities, Greene installed the appropriate subsurface piping to allow for the extraction of vapors and liquids from monitoring wells MW01A, MW02, MW03, MW07, MW12, MW14, MW15, MW19, MW21, MW22, MW23, MW24, MW25, MW26, MW27, and MW28. A significant vacuum will be generated by the vacuum pump or pumps and exerted through a system of subsurface piping to the selected recovery wells. The recovery stream consisting of liquid and vapor waste will immediately enter a phase separation vessel. Any vapors recovered from the subsurface will proceed to the vacuum source and exit the system via the vacuum pumps exhaust stack. The majority of petroleum contamination is expected to be recovered through this pathway. Any recovered liquids will be retained in the phase separation vessel until transferred to an oil water separator. Any free phase contamination still present will be drained by gravity to a product storage tank. The remaining water will be transferred through an air stripper where clean air will be used to reduce the concentration of any dissolved contamination. The air stripper exhaust will be vented to the atmosphere through an exhaust stack and the effluent water will pass through carbon filtration units prior to discharging to a vegetated ditch draining to an unnamed intermittent tributary to Tuggle Creek. Additional discussion of the effluent liquid and vapor discharges is provided in Sections 11.2 and 11.4 of this report, respectively.

The DPE system will be operated for 24 hours per day, 7 days a week until the free product endpoint of <0.01 feet is achieved. It will then be operated in the same manner for an additional quarter to further reduce the residual phase contamination and the potential for additional free phase petroleum formation.

7.0 Petroleum Mass Estimate

7.1 Vapor Phase Mass

Vapor phase contamination exists where the released substance has migrated in the gaseous form into the air filled soil pore spaces. Although no vapor phase mass estimate exists, as a true soil gas survey has yet to be conducted at the site, it may be safe to assume the vapor mass makes up a relatively small portion, likely less than one percent of the total mass.

7.2 Residual Phase Mass

Residual phase contamination exists where the released substance has migrated into the soil void spaces at levels below those recognizable as free product or where natural decomposition products from the released substance have migrated into the soil void spaces. The residual phase contamination levels have been determined from soil samples tested for TPH-GRO, BTEX, MTBE, and naphthalene. However, only limited

residual phase contamination has been observed at the Meadows of Dan Food Market facility. Elevated TPH-GRO concentrations of 5,520 mg/kg, 1,470 mg/kg, and 2,420 mg/kg were observed proximal to the east of the leaking premium gasoline UST during closure activities and a soil sample collected from beneath the east gasoline dispenser yielded a TPH-GRO concentration of 2,390 mg/kg. However, based on the additional soil samples collected during UST closure activities, the elevated residual phase petroleum contamination appears to be located in generally unquantifiable limited pockets proximal to the east end of the former premium gasoline UST and east gasoline dispenser, and therefore, a mass estimate has not been calculated for these soils.

Elevated TPH-GRO contamination also was observed during soil boring/monitoring well installation activities performed as part of site characterization. Greene utilized the soil sample analytical results collected during boring installation to calculate the residual phase mass at the Meadows of Dan Food Market facility. The estimate is limited to the area within the current borehole array and is somewhat restricted by the limited number of soil samples collected from the borings. The estimate was calculated by separating the site into five foot thick vertical layers, calculating the average TPH-GRO concentrations for each layer, and finally calculating the mass estimate for each layer. Greene did not calculate the residual phase mass for the vertical layer containing the free phase layer (25'-30') due to the majority of the petroleum mass in this layer having already been accounted for in the free phase mass estimate (Section 7.4). More specific details about the methodology and techniques used in generating this estimate are explained within the Residual Phase TPH-GRO Mass Estimate in Appendix E. The estimate reveals that approximately 4,072 pounds of gasoline range contamination exists in the residual phase beneath the site. It should be noted that this estimate applies to the residual phase mass prior to DPE pilot test implementation. The mass of the residual phase contamination currently beneath the site is expected to have been decreased slightly during the pilot study.

7.3 Dissolved Phase Mass

Dissolved phase contamination exists where the released substance or decomposition products from the released substance have migrated into the groundwater or into surface waters. The dissolved phase contamination concentrations have been determined from groundwater samples tested for TPH-GRO and VOC's including oxygenates. Relative to the free phase mass, the mass of petroleum contamination believed to be contained within the dissolved phase mass is extremely small. For this reason, the mass of dissolved phase petroleum believed to be present at the site has not been estimated.

7.4 Free Phase Mass

To date, free phase contamination or free product, has been observed in monitoring wells MW01A, MW02, MW03, MW07, MW12, MW14, MW15, MW19, MW21, MW22, MW23, MW24, MW25, MW26, and MW28. Gauging events performed at the Meadows of Dan Food Market facility have yielded free product thicknesses from 0.01 feet to 5.97 feet. Due to the performance of multiple vacuum truck recovery events and a DPE pilot study, the measured free product thicknesses have fluctuated significantly and a trend has not been established. Results of the gauging event performed prior to the performance of the DPE pilot study yielded measurable free product thicknesses in 14 of the 28 monitoring wells. Table 4 included in Appendix A, Page 22 is a summary of the free product thicknesses.

Greene contracted Groundwater & Environmental Services, Inc. (GES) to calculate the volume of free phase petroleum located at the Meadows of Dan Food Market facility. Modeling performed to calculate the free product volume was based on a single set of observed product thicknesses collected on November 5, 2014 prior to the performance of the 14-day DPE pilot study. In addition, modeling ignored the limited residual phase contamination and only considered what was currently mobile at the site. GES utilized the ARMOS (ES&T, 1996) program to perform the volume estimation modeling. ARMOS differs from the “pancake model” in that it uses capillary functions to determine a soil saturation profile instead of sharp, well-defined oil water interface. A grid with multiple data points was constructed based on the contoured product thickness and saturation profiles were generated for each data point. Based on the modeled saturation profiles the estimated volume for each data point was determined. The sum of all the data points resulted in the free phase petroleum volume estimate. Modeling performed by GES indicates a modeled volume of 13,263 gallons of free phase petroleum existing at the subject site. A copy of the letter report documenting the modeling is included in Appendix E.

7.5 Total Mass Estimate

The true mass of petroleum contamination present at the site is a combination of the vapor, residual, dissolved, and free phases. Although no vapor phase mass estimate exists, as a true soil gas survey has yet to be conducted at the site, it may be safe to assume the vapor mass makes up a relatively small portion of the total mass. The same holds true with the dissolved phase mass. Residual phase mass calculations estimate 4,072 pounds of TPH-GRO contamination exist at the Meadows of Dan Food Market facility. However, it appears the majority of the total petroleum mass remaining at the site exists as free phase. Modeling performed by GES from gauging data collected on November 5, 2014 prior to the 14-day DPE pilot study estimates approximately 82,231 pounds of free phase mass. This estimate combined with the residual phase estimate yielded a total petroleum mass of 86,303 pounds. However, since this estimate was created using data

collected prior the pilot study, the estimate should be corrected to account for the approximately 4,605 pounds of petroleum contamination having been removed. Due to the lack of a significant vapor phase or dissolved phase mass it is assumed the majority of the recovered petroleum mass was derived from the residual phase and free phase. As a result, it is estimated the total mass of petroleum remaining onsite is approximately 81,698 pounds.

8.0 Remediation Endpoints

Currently, there are no calculated remediation endpoints for the vapor, residual, and/or dissolved phases of the petroleum contamination located at the Meadows of Dan Food Market facility. The true endpoint for the remediation of this site is the reduction of free phase contamination to levels no longer measurable during gauging with an oil-water interface probe, i.e. $<0.01'$. It is expected that correlations between vapor, residual, and dissolved phase concentrations and free phase formation may be observed during long-term remediation implementation. The observation of such correlations may lend itself to more accurate estimation of final remediation endpoints.

9.0 Projected Time to Achieve Endpoints

Mass estimates indicate that approximately 81,698 pounds of petroleum contamination remains of the 86,303 pounds thought to have been present prior to the DPE pilot study. Of the approximately 4,605 pounds of contamination recovered during the two week DPE pilot study, approximately 2,303 pounds were recovered during the initial phases when individual recovery wells were being utilized one at a time. The remaining 2,302 pounds were recovered during the multiple well phase of the pilot study when seven monitoring wells were being utilized as extraction wells. Data collected during the multiple well phase of the pilot study is thought to best represent the expected results of long term DPE implementation; as such, site specific remediation recovery rates were estimated using the data collected during this phase.

Using a starting mass of 86,303 pounds of petroleum and the average daily petroleum recovery mass of approximately 389 pounds, the average daily recovery rate during the multiple well phase of the pilot study was found to be 0.45%. However, based on the increased capacity of the proposed remediation system, Greene conservatively estimates the initial recovery rate of the proposed remediation system to increase by approximately 50% to 584 pounds per day or 0.68%. This initial recovery rate is thought to be artificially elevated due to the large initial volumes of free phase contamination that were/and will be immediately recovered from the well casings, sand packs, and nearby soils. The reduction of subsurface petroleum contamination by DPE is thought to be best represented through use of an exponential decay model. The daily recovery rate of 0.68% was applied to an equation expressing exponential decay resulting in a calculated decay

constant (k) of -0.006823. Based on a decay constant of -0.006823, the remaining petroleum mass was estimated to be reduced to one-half and one-quarter of its current mass following approximately 102 days and 203 days of DPE application respectively. Calculation sheets explaining how the recovery rate and length of DPE implementation were calculated are included in Appendix F.

It is expected that this recovery rate will drop to a fraction of its calculated value within the first several weeks of long term DPE implementation. For the purpose of estimating a reasonable remediation time period, decay constants of -0.003412 and -0.001706 have been calculated based on $\frac{1}{2}$ of the calculated daily recovery rate (0.3412%) and $\frac{1}{4}$ of the daily recovery rate (0.1706%) respectively and have been applied to the remaining petroleum mass. This information has been outputted into a graph which depicts the effects of the various recovery rates on the remaining petroleum mass as a function of time. For reference, linear mass recovery of 584 pounds daily also was included in the graph. A copy of the Petroleum Mass Graph is included in Appendix F.

Mass removal rates have been estimated based on the average daily mass recovery observed during the multiple well phase of the pilot study and the calculated daily recovery rate and fractions of it. The remaining petroleum mass currently present at the site is expected to be recovered from the subsurface at an ever decreasing rate. This rate should most likely fall between the 0.68% calculated rate of recovery and 0.1706%, which is $\frac{1}{4}$ of the calculated rate of recovery. Based on this information, the remaining petroleum mass is expected to be reduced to one-half of its current mass within 102 to 406 days and one-quarter of its total mass within 203 to 813 days of long term DPE implementation. Data gathered during long-term implementation will allow for improved timeframe estimation.

10.0 Project Implementation and Scheduling

10.1 Site Preparation & Modifications

As part of IA CAP IMP activities, Greene prepared the site for long term utilization of remediation technology to address the observed petroleum contamination observed both onsite and offsite. Greene selected 16 monitoring wells to be utilized as remediation system extraction wells at the facility. Monitoring wells MW01A, MW02, MW03, MW07, MW12, MW14, MW15, MW19, MW21-26, and MW28 were selected due to free product being observed within them. In addition, monitoring well MW27, which has never been found to contain observable free product, also was selected to be utilized as an extraction well in order to reduce the migration of the petroleum plume offsite. Dedicated 2" schedule 40 PVC piping was installed from the selected monitoring wells in a series of shallow trenches to a 24" x 24" steel vault located in a grassy/gravel

area on the north site of the property. In addition, the well covers for MW01A, MW02, MW03, MW07, MW12, MW14, MW15, MW19, and MW21-MW28 were removed and replaced with 24" x 24" steel vaults to allow for connection of the PVC piping to the well heads including the installation of the appropriate in-line metering and adjustment equipment. Detailed information regarding the installation of the subsurface piping and well head modifications was included in the IA CAP IMP dated February 13, 2015.

Although, the majority of site preparation was performed during the IA CAP IMP phase of work, additional activities will be performed during CAP IMP to allow for the operation of the DPE system. The DPE system itself will require an electrical hookup and a means of discharging effluent water to the vegetated drainage ditch. Additionally, the subsurface piping previously installed will need to be connected to the DPE system influent manifold.

10.2 Electrical Service

On May 12, 2015, Greene personnel met with Mr. Chad Foster, an Appalachian Power (AEP) Engineering Technician Sr., to discuss the availability and type of 3-phase power and service options. During the meeting, it was determined that 240 volt, Wye 3-phase power would be available to the site; however, Mr. Foster stated a new pole would need to be installed on the Meadows of Dan Food Market property. Subsequent to the installation of the new power pole, the next step in acquiring electrical service for the system will be installing a meter base and breaker panel with an attached mast. Following building inspector approval, AEP will provide a drop line and install the electrical meter.

10.3 System Operation

Remediation efforts will utilize monitoring wells MW01A, MW02, MW03, MW12, MW14, MW15, MW19, and MW22-28 as the recovery wells. The system is to be operated for 24 hours per day, 7 days a week until the free product endpoint of <0.01 feet is achieved. The system will then be operated on the same schedule for one additional quarter. It is expected that the system will run for greater than one year. Due to the qualities of the newer rotary claw vacuum pumps, there are no scheduled maintenance related shut downs during the first year of operation. There may however be unanticipated shutdowns due to system alarms and/or power interruption. Barring failure of any major system components, system restart is expected within two business days of shutdown. In most cases system restart is expected within 24 hours.

10.4 Monitoring

10.4.1 System Monitoring

During start-up, the system will be observed for eight hours a day until it has been sufficiently optimized. Optimization is expected to take between three to five days. Following optimization, twice weekly, half-day site visits will be made in order for the system to be monitored and for any additional adjustments to be made. After the system has been operational for one month, site visits will be scaled back to one, half-day event conducted weekly. This weekly monitoring schedule will be carried out through the first quarter of system operation and will then be reduced to twice monthly thereafter for the duration of the project. The following is a list of the activities that will be conducted during site visits. Table 14 included in Appendix A, Page 41 is a summary of the proposed operational monitoring schedule.

1. Each monitoring well will be gauged for depth to product and depth to water.
2. Vacuum readings will be observed and recorded for each recovery well and each observation well.
3. Vacuum pump and air stripper exhaust ports will be monitored for their respective flow rates, temperatures, pressures, and VOC contents.
4. All system hour meters and water totalizers will be observed and their information recorded.

In addition to the onsite monitoring events, Greene will perform remote system checks via the system's telemetry system. Information collected during these events will be used to verify proper system operation, as well as to determine any system adjustments needing to be made during upcoming site visits.

10.4.2 Post Operational Monitoring

Subsequent to obtaining the requested remediation endpoint of <0.01 feet, the remediation system will be deactivated. Following system shutdown, post operational CAP monitoring events will be conducted on a quarterly basis for one full year. During these events, all site monitoring wells will be gauged and depth to water information will be recorded. Should free product be encountered during these events its presence will be immediately reported to the VA DEQ and the remediation system will be reactivated. The remediation system will be dismantled and removed from the Meadows of Dan Food Market property after the endpoint has been achieved for a period of four consecutive quarters during post operational monitoring.

10.5 Sampling

Sampling events will be scheduled to coincide with ongoing monitoring visits. During the first week of operation, sampling will be conducted during system startup and during the last site visit of the week.

Sampling will be conducted once per week during the remainder of the first month of operation, and once per month for the duration of system operation. Samples will consist of the influent and effluent system water, and the vacuum pump and air stripper exhaust vapors. Water samples will be analyzed for TPH-GRO, BTEX, MTBE, naphthalene, ethanol, and pH, while air samples will be analyzed for TVPH, BTEX, and MTBE.

10.6 Reporting

Remediation progress will be reported on a quarterly basis to the VA DEQ in Quarterly CAP Implementation Reports. These reports will follow the EPA “O&M Report Template for Ground Water Remedies (With Emphasis on Pump and Treat Systems).” Each report will provide system operational data, monitoring data, and laboratory data in a chronological narrative as well as in tabular form. Special attention will be given to any operational changes and to any perceived changes in system effectiveness. To this end, quarterly and total petroleum recovery estimates including individual phase calculations will be included in each report. Also included in each report will be time and cost estimates to complete the remediation effort. Expected Appendices to the report may include: Laboratory Results/Chains of Custody, Calculation Sheets, Correspondence, Utility Billing Data, Site Visit Logs, and Various Site Maps.

The following is a brief outline of the expected contents of the Quarterly CAP Implementation Reports:

- Title Page
- Table of Contents
- Executive Summary
- Introduction
- Operations
- Monitoring
- Sampling
- Recovery
- Suggested System Modifications
- Time and Cost Estimates
- Conclusions and Recommendations
- Appendices

Following system shutdown, quarterly post operational CAP monitoring reports documenting the quarterly monitoring events will be submitted. These reports will be similar in structure to the CAP Implementation Reports.

11.0 Contaminated Media Management

11.1 Free Phase Product

Free product recovered during operation of the DPE remediation system will be transferred to an OWS. The OWS will be equipped with a rotating skimmer weir, which captures free product within the separator. The product will be conveyed from the OWS to an estimated 55-gallon drum. The drum will be vented to the outside of the trailer. Free product accumulation within the 55-gallon drum will be removed on an as needed basis. Liquid contents will be manifested, transported, and properly disposed or recycled. The appropriate manifests for the transport and disposal of the recovered liquids from the 55-gallon drum will be submitted to the VA DEQ.

11.2 Contaminated Groundwater

Due to the absence of sanitary sewer availability, Greene proposes to discharge the treated liquid effluent to a vegetated ditch draining to an unnamed intermittent tributary to Tuggle Creek. Specifically, Greene proposes installing effluent piping from the remediation system north towards Baptist Church Lane (State Route 614) and then parallel to the road northeast until daylighting at the vegetated drainage ditch. As such, a Virginia Pollutant Discharge Elimination System (VPDES) General Permit will be required. On May 26, 2015, Greene submitted the VPDES General Permit Registration Statement for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests (VAG83) to the VA DEQ. On June 2, 2015, the VA DEQ issued the Meadows of Dan Food Market facility coverage under the General VPDES Permit. Copies of the VPDES General Permit Registration Statement, which includes mapping and the proposed subsurface piping location, and the VA DEQ Coverage Letter dated June 2, 2015 are provided in Appendix G.

As required by the General Permit, liquid effluent samples will be collected on a monthly basis to mitigate concern associated with the discharge of treated petroleum impacted groundwater. Results of the liquid effluent samples will be submitted to the VA DEQ by the 10th of each month as part of a Discharge Monitoring Report (DMR). The initial DMR will be submitted to the VA DEQ by August 10, 2015. A copy of a blank DMR is provided in Appendix G.

11.3 Fouled/Spent Carbon

Dependent upon observed site conditions during system operation, the vapor and liquid carbon units may require change-out of the carbon supply. If the integrity of the carbon filtration units is compromised by fouled or spent carbon, Greene will request authorization from the VA DEQ to provide a new reactivated or virgin supply. Spent carbon will be removed by the manufacturer's vendor and transported to their facility for regeneration.

11.4 Petroleum Vapors

During system operation, exhaust gases will be discharged from the RCP vent stack and from the air stripper vent stack on a daily basis. During the initial stages of the implementation, as much as 20-25 pounds per hour of total VOCs could be emitted with the exhaust gases. This figure is expected to decrease significantly over time. As previously stated, Greene proposes to install a 2,000 pound vapor carbon filtration unit to reduce the volume of contamination emitted to the atmosphere during this first quarter of system operation. Based on the implementation of the carbon unit and current calculations, it is expected that the system will be allowed to emit petroleum vapors to the atmosphere. As a result, Greene does not anticipate the system will require a state operating permit.

12.0 Permitting Requirements

Information collected during the DPE Pilot Study conducted in November of 2014 has been used to determine the applicability of current permitting requirements. Specifically, a General VPDES Permit to ultimately discharge the treated liquid effluent to an unnamed intermittent tributary to Tuggle Creek and an Air Operating Permit Application requesting a nonbinding applicability determination, has been submitted to the VA DEQ. Further details regarding the liquid and air discharge permits/applications is provided in the following sections.

12.1 Liquid Disposal

Approximately 27,838 gallons of free product and contaminated groundwater were recovered, retained on site, and disposed of via vacuum truck during the DPE Pilot Study. During long-term DPE implementation, the stream of contaminated groundwater exiting the treatment system will be piped to a vegetated ditch draining to an unnamed intermittent tributary to Tuggle Creek. As mentioned in Section 11.2, Greene has obtained the required VPDES general permit to discharge the treated liquid effluent. Further, monthly liquid effluent samples will be collected and the required DMRs will be completed and submitted to the VA DEQ.

12.2 Air Emissions

During the DPE Pilot Study, approximately 4,355 pounds of TVPH were recovered through the vapor phase. It is important to note that this data set included observations made while significant volumes of liquid free phase product were recovered and volatilized by the DPE system at startup resulting in elevated vapor phase concentration levels. Similar elevated vapor phase concentration levels are to be expected during the initial startup period of long-term DPE implementation.

However, it is expected that the easily available free product, that volume being within the well casings, sand packs, and immediately adjacent soils, will be moved through the system within several weeks of operation and

VOC concentrations within stack emissions will stabilize at lower levels. As a result, the air emission calculations used in determining the applicability of air permitting to this project, the average concentrations observed during the multiple well phase of the pilot study, are likely elevated and are expected to decrease significantly over the course of system operation. The data used to generate the estimates as well as the results are included below:

AVERAGE ROTARY CLAW PUMP STACK EMISSION CALCULATIONS				
CONTAMINANT	AVERAGE CONCENTRATION (mg/m3)	APPROXIMATE AIR FLOW (SCFM)	CALCULATED HOURLY EMISSION (lbs/hr)	CALCULATED ANNUAL EMISSION (tons/year)
Benzene	171.31	264	0.1690	0.7404
Toluene	1,669.88	264	1.6478	7.2174
Ethylbenzene	275.63	264	0.2720	1.1913
Xylenes	1,241.63	264	1.2252	5.3664
MTBE	123.50	264	0.1219	0.5338
TVPH	14,997.50	264	14.7993	64.8209

AVERAGE AIR STRIPPER STACK EMISSION CALCULATIONS¹				
CONTAMINANT	AVERAGE CONCENTRATION (mg/m3)	APPROXIMATE AIR FLOW (SCFM)	CALCULATED HOURLY EMISSION (lbs/hr)	CALCULATED ANNUAL EMISSION (tons/year)
Benzene	13.73	140	0.0018	0.0079
Toluene	634.25	140	0.0830	0.3634
Ethylbenzene	67.41	140	0.0088	0.0386
Xylenes	378.25	140	0.0495	0.2167
MTBE	37.36	140	0.0049	0.0214
TVPH	1,174.88	140	0.1537	0.6732

¹Air stripper calculations assume the air stripper will only be operating 25% of every hour.

DUAL PHASE EXTRACTION SYSTEM EMISSIONS CALCULATIONS ¹								
CONTAMINANT	RCP STACK		AIR STRIPPER STACK		SYSTEM TOTALS		EXEMPTION RATES	
	HOURLY EMISSION	ANNUAL EMISSION	HOURLY EMISSION	ANNUAL EMISSION	HOURLY EMISSION	ANNUAL EMISSION	HOURLY EMISSION	ANNUAL EMISSION
Benzene	0.1690	0.7402	0.0018	0.0079	0.1708	0.7481	2.112	4.64
Toluene	1.6478	7.2174	0.0830	0.3635	1.7308	7.5809	18.645	54.665
Ethylbenzene	0.2720	1.1914	0.0088	0.0385	0.2808	1.2299	17.919	62.93
Xylenes	1.2252	5.3664	0.0495	0.2168	1.2747	5.5832	21.483	62.93
MTBE	0.1219	0.5339	0.0049	0.0215	0.1268	0.5554	11.88	26.1
TVPH	14.7993	64.8209	0.1537	0.6732	14.953	65.4941	None	25

¹Air stripper calculations assume the air stripper will only be operating 25% of every hour.

Actual Calculation Sheets are included in Appendix H.

Emission calculations reveal that the overestimated emissions of BTEX constituents and MTBE are less than their respective hourly and annual exemption rates, while total VOC emissions are greater than the annual exemption level. There are no hourly limitations on total VOC emissions.

Using this method of overestimation, implementation of a DPE system would require an application for an air permit because of the projected annual emissions of total VOCs. However, due the proposed implementation of a vapor carbon filtration unit during the first quarter of operation, the majority of the easily available free product will be recovered and the daily mass recovery will decrease significantly. Additionally, the remaining petroleum mass is expected to be reduced to one-half of its current mass within 103 to 412 days and one-quarter of its total mass within 206 to 825 days of long term DPE implementation. Based on the implementation of the vapor carbon filtration unit during this first quarter of system operation and the estimated time to reduce the petroleum mass total VOCs are not expected to be emitted at a rate of greater than the 25 tons per year threshold.

In order to verify exemption from the air permitting requirements, Greene submitted a completed Air Operating Permit Application requesting a nonbinding applicability determination to Mr. Jed Brown of the VA DEQ-BRRO on June 30, 2015. A copy of the complete Air Operating Permit Application as submitted to the VA DEQ-BRRO is included in Appendix I.

13.0 Public Notice

A Public Notice for Implementation of this CAP appeared in The Enterprise on June 3, 2015 and June 10, 2015. A copy of the Public Notice Verification is included in Appendix J.

14.0 Cost Estimate

The cost estimate has been broken down into site preparation expenses, operational expenses, and equipment expenses. Site preparation activities are to be conducted prior to system mobilization and will be one time only. Operational expenses include time, materials, laboratory costs associated with following the work schedules as laid out in this CAP. These expenses have been totaled and are presented as quarterly costs.

14.1 Site Preparation Expenses

As discussed in Section 3.4.2 of this report, modification to the wells and the majority of the subsurface piping was performed during the IA CAP IMP phase or work. However, during CAP Implementation, several additional activities will be performed prior to mobilization of the DPE system to the site. The DPE system itself will require an electrical hookup and a means of discharging effluent water to the vegetated ditch. The total estimated cost associated with completion of site preparation performed during CAP Implementation is \$10,000.

14.1.1 Electrical Service

On May 12, 2015, Greene personnel met with Mr. Chad Foster, an Appalachian Power (AEP) Engineering Technician Sr., to discuss the availability and type of 3-phase power and service options. During the meeting, it was determined that 240 volt, Wye 3-phase power would be available to the site; however, Mr. Foster stated a new pole would need to be installed on the Meadows of Dan Food Market property. Based on the anticipated power consumption there will be no cost associated with installing the new power pole. The total estimated cost for permitting, materials, and installation of a permanent post-mounted electrical service is \$1,000.

14.1.2 General VPDES Permit VAG83

Due to the absence of sanitary sewer availability, Greene proposes to discharge the treated liquid effluent to a vegetated ditch draining to an unnamed intermittent tributary to Tuggle Creek. As mentioned in Section 11.2, Greene has obtained the required VPDES general permit to discharge the treated liquid effluent. Further, monthly liquid effluent samples will be collected and the required DMRs will be completed and submitted to the VA DEQ. Currently, no fees are required for coverage under general permits for Petroleum Contaminated Site, Groundwater Remediation, and Hydrostatic Tests (VAG83). There will be costs associated with the DMR sampling; however, further discussion of sampling costs are provided in Section 14.2.2.

14.1.3 Site Modifications

The subsurface remediation piping installed during IA CAP IMP activities will be connected to the mobile remediation system influent manifold. In addition, subsurface piping will be installed from the remediation system discharge port to the vegetated ditch located proximal to the end of Baptist Church Lane. As stated previously the total estimated cost of material and installation associated with these activities is \$9,000.

14.2 Operational Expenses

There will be several ongoing expenses associated with CAP Implementation including costs associated with utility service, site monitoring, sample collection and analysis, report preparation. It is expected that the operational expenses will range from approximately \$18,000-\$22,000 during each quarter of system operation during CAP Implementation. Costs are expected to drop to approximately \$3,000-\$5,000 per quarter during post operational CAP Monitoring.

14.2.1 Utilities

During CAP Implementation, Greene will be billed monthly for electrical service and telemetry. Electrical service is expected to be approximately \$1,000 to \$1,500 per month, and telemetry service is expected to cost approximately \$50 per month. The total approximated utility liability is expected to range from \$3,150 to \$4,650 per quarter.

14.2.2 Monitoring/Sampling Activities

Based on the monitoring/sampling schedule developed as part of this CAP, costs associated with travel to and from the site, site monitoring, and sample analysis will be approximately \$10,000-\$15,000 during each quarter of system operation during CAP Implementation. Monitoring and travel costs are expected to drop to approximately \$2,000-\$3,000 per quarter during the post operational CAP Monitoring Phase.

14.2.3 Report Preparation

Quarterly CAP Implementation Reports are expected to cost approximately \$5,000 each and the post-operational CAP Monitoring Reports are expected to cost approximately \$1,500 each.

14.3 Equipment Expense/Lease Vs. Purchase

As stated in the VA DEQ Storage Tank Program Technical Manual, "Performing a lease vs. purchase analysis is not required if the projected use of the remediation system or component is for one year or more and the components are purchased using Reimbursement Program bidding procedures." Greene expects achievement

of remediation endpoints to take one full year or longer, and as a result a lease versus purchase analysis has not been performed.

15.0 Conclusions

During additional receptor sampling activities performed during the CAP Development phase of work, Greene determined that the Janie Stidham Property (DW04) has been impacted with petroleum. It also was confirmed that this supply well provides potable water to the Former Dan River Books (DW05) and the Cassell Farms Property (DW06). Further, it was determined that the Jane's Country Café (DW03) property also was being provided potable water from DW04, and the drinking water samples previously collected from the DW03 property likely represent the supply well on the DW04 property. The connection between the DW03 and DW04 properties has been blocked and each property is now utilizing their respective wells. A VA DEQ AWS program approved contractor has installed a CFU system at the Janie Stidham Property (DW04). It is worth mentioning that the two recently collected sample sets known to represent the Jane's Country Café (DW03) supply well have yielded Non Detected for petroleum constituents.

During development of this CAP, Greene considered several remediation technologies for long term implementation at the Meadows of Dan Food Market facility. After exploring the merits and limitations of each option, Dual Phase Extraction has been identified as the best fit technology for efficient and cost effective remediation of the petroleum release currently under study at the subject site. Based on the current petroleum mass estimate and the predicted recovery rates, approximately one year of continuous system operation is projected to achieve free phase endpoints. This projection will continuously be updated during CAP Implementation as data is collected.

The VA DEQ has issued the Meadows of Dan Food Market facility coverage under the VPDES General Permit for the discharge of system effluent water. At this time, it is expected that an air permit for the system effluent air discharge from the proposed system will not be required; however, an Air Operating Permit Application requesting a non-binding applicability determination has been submitted to the VA DEQ for confirmation.

Following CAP approval, Greene will complete site preparation activities and solicit bids for the purchase of a DPE system. Current build times indicate an approximate three month lag between bid acceptance and system delivery.

End of the Corrective Action Plan

APPENDIX A

Tables

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Table 1.
Summary of Initial Abatement Measures Report Residual Phase Analytical Results

Sample ID	Date	Depth (feet)	Location	PID Reading (ppm)	TPH-GRO ¹	Benzene ²	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphthalene
CS01	12/30/13	NA ³	NA	120.0	25.1	NA	NA	NA	NA	NA	NA
CS02	12/30/13	NA	NA	33.5	5.46	NA	NA	NA	NA	NA	NA
CS03	12/31/13	NA	NA	858.0	27.3	NA	NA	NA	NA	NA	NA
CS04	12/31/13	NA	NA	85.1	27.3	NA	NA	NA	NA	NA	NA
CS05	12/31/13	NA	NA	1,335	1,700	NA	NA	NA	NA	NA	NA
CS06	12/31/13	NA	NA	1,261	3,990	NA	NA	NA	NA	NA	NA
CS07	01/03/13	NA	NA	111.0	75.3	NA	NA	NA	NA	NA	NA
SW01	12/31/13	12.0	West Sidewall	17.5	0.285	ND ⁴	0.00162	ND	0.00445	0.127	0.0149
SW02	12/31/13	12.0	West Sidewall	22.8	0.238	ND	ND	ND	ND	0.0439	ND
SW03	12/31/13	12.0	North Sidewall	10.6	0.136	ND	ND	ND	ND	0.0687	ND
SW04	12/31/13	12.0	South Sidewall	21.6	0.315	ND	0.00132	ND	ND	0.0428	0.00723
SW05	12/31/13	12.0	North Sidewall	35.8	0.296	ND	ND	ND	0.00347	0.142	0.0286
SW06	12/31/13	12.0	South Sidewall	32.7	0.290	ND	0.00102	ND	ND	0.336	0.0494
SW07	12/31/13	12.0	North Sidewall	90.5	0.281	ND	0.00104	ND	ND	0.0763	0.00643
SW08	12/31/13	12.0	East Sidewall	234.9	7.98	ND	0.00184	ND	ND	0.816	0.109
SW09	12/31/13	12.0	East Sidewall	2,100	1,470	0.421	55.1	38.9	220	ND	19.6
SW10	12/31/13	12.0	South Sidewall	1,453	5,520	3.92	254	132	748	2.73	41.9
F04	12/31/13	14.0	Basin Floor	122.4	0.971	ND	0.00291	0.00110	0.00812	2.69	0.0182
F04-1	12/31/13	14.0	Basin Floor	47.8	0.214	ND	0.00116	ND	ND	0.0604	0.00754
F04-2	12/31/13	14.0	Basin Floor	52.7	0.383	ND	0.00227	ND	ND	0.340	0.0252
F05	12/31/13	14.0	Basin Floor	1,971	502	0.00100	4.67	6.06	56.7	1.27	26.1
F05-1	12/31/13	14.0	Basin Floor	21.3	0.355	ND	0.00176	ND	0.00365	0.0452	0.0161
F05-2	12/31/13	14.0	Basin Floor	65.9	8.18	ND	0.00215	ND	0.00325	0.556	0.0153
F06	12/31/13	18.0	Basin Floor	320.3	8.69	ND	0.00417	ND	0.00437	1.94	0.0127

Table 1 (Cont'd).**Summary of Initial Abatement Measures Report Residual Phase Analytical Results**

Sample ID	Date	Depth (feet)	Location	PID Reading (ppm)	TPH-GRO ¹	Benzene ²	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphthalene
F06-1	12/31/13	15.0	Basin Floor	296.2	5.95	ND	0.00175	ND	ND	3.39	0.0131
F06-2	12/31/13	18.0	Basin Floor	1,349	2,420	0.0209	86.2	60.1	386	0.0680	35.5
D01	01/03/13	4.0	Dispenser #1	393.9	2,390	0.0141	17.6	20.0	244	0.0554	322
D02	01/03/13	3.0	Dispenser #2	8.6	0.781	ND	0.00116	ND	0.00307	ND	0.0125
L01	01/03/13	3.0	Product Line	21.4	0.570	ND	ND	ND	ND	ND	ND
L02	01/03/13	3.0	Product Line	40.2	ND	ND	ND	ND	ND	ND	ND

¹TPH-GRO analysis via EPA method 8015B; reported in milligrams/kilogram (mg/kg).

²BTEX, MTBE, naphthalene analysis via EPA method 8021B; reported in mg/kg.

³NA = Not applicable.

⁴ND = Non Detected.

Table 2.
Summary of Soil Boring Residual Phase Analytical Results

Sample Identification	Date	Sample Depth (feet)	TPH-GRO ¹	TPH-DRO ²	Benzene ³	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphthalene
B01-1	02/24/14	0-4	ND ⁴	NA ⁵	ND	0.00660	ND	0.00478	0.280	ND
B01-2	02/24/14	4-8	ND	NA	ND	0.00148	ND	ND	0.214	ND
B01-3	02/24/14	8-12	ND	NA	ND	0.00471	ND	0.00675	1.03	0.00505
B01-4	02/24/14	12-16	ND	NA	0.0132	0.0846	0.00915	0.0487	ND	ND
B01-6	02/24/14	20-24	17.8	NA	0.00114	0.0722	0.113	2.36	1.18	0.541
B01-7	02/24/14	24-28	1,550	NA	0.701	46.1	33.9	189	1.15	16.5
B01-8	02/24/14	28-32	4,890	NA	14.7	246	112	637	11.2	35.8
B01-9	02/24/14	32-35	1,190	NA	0.567	28.3	22.0	132	ND	15.8
B02-1	02/24/14	0-4	ND	NA	ND	0.00226	0.00152	0.00931	0.0298	ND
B02-2	02/24/14	4-8	ND	NA	ND	0.00171	ND	0.00327	0.101	ND
B02-3	02/24/14	8-12	ND	NA	ND	0.00438	0.00223	0.0279	1.38	1.91
B02-4	02/24/14	12-16	22.9	NA	ND	0.0130	0.383	1.07	0.842	3.8
B02-5	02/24/14	16-20	799	NA	0.00333	5.5	13.7	74.7	0.586	35.2
B02-6	02/24/14	20-24	ND	NA	0.00198	0.00618	0.000912	0.0136	0.617	0.584
B02-7	02/24/14	24-28	479	NA	0.0600	10.7	13.1	53.9	1.10	11.5
B02-8	02/24/14	28-32	6,000	NA	6.82	207	109	612	1.78	54.3
B02-9	02/24/14	32-34	1,830	NA	0.366	52.6	40.6	242	0.501	21.7
B03-1	02/25/14	0-4	ND	NA	ND	0.00104	ND	0.00291	ND	ND
B03-2	02/25/14	4-8	ND	NA	0.00102	0.0221	0.00448	0.0206	ND	ND
B03-3	02/25/14	8-12	ND	NA	ND	0.00264	0.00109	0.00561	0.0164	ND
B03-4	02/25/14	12-16	ND	NA	ND	0.00104	ND	ND	0.0239	ND
B03-5	02/25/14	16-20	ND	NA	ND	ND	ND	ND	ND	ND
B03-6	02/25/14	20-24	ND	NA	ND	0.00366	ND	ND	0.0321	ND
B03-7	02/25/14	24-28	7.97	NA	ND	0.0375	0.0483	1.85	0.0912	0.798

Table 2 (Cont'd).
Summary of Soil Boring Residual Phase Analytical Results

Sample Identification	Date	Sample Depth (feet)	TPH-GRO ¹	TPH-DRO ²	Benzene ³	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphthalene
B03-8	02/25/14	28-32	2,150	NA	1.6	52.7	34.5	201	ND	16.9
B03-9	02/25/14	32-33	3,790	NA	5.7	168	88.6	451	1.06	28.5
B03-10	02/25/14	33-35	705	NA	ND	8.75	11.7	82.3	ND	14.8
B04-7	02/25/14	24-28	ND	NA	ND	0.00447	0.000992	0.00569	ND	ND
B04-8	02/25/14	28-32	ND	NA	ND	0.00130	ND	ND	ND	ND
B04-9	02/25/14	32-36	ND	NA	ND	ND	ND	ND	ND	ND
B05-6	02/26/14	20-25	ND	NA	ND	ND	ND	ND	ND	ND
B05-7	02/26/14	25-30	ND	NA	ND	ND	ND	ND	ND	ND
B05-8	02/26/14	30-35	ND	NA	ND	ND	ND	ND	ND	ND
B06-7	02/26/14	24-26	ND	NA	ND	ND	ND	ND	ND	ND
B06-8	02/26/14	26-30	ND	NA	ND	ND	ND	ND	ND	ND
B06-9	02/26/14	30-35	ND	NA	ND	ND	ND	ND	ND	ND
B07-1	04/28/14	0-4	ND ⁴	ND	ND	ND	ND	ND	ND	ND
B07-2	04/28/14	4-8	ND	ND	ND	ND	ND	ND	ND	ND
B07-3	04/28/14	8-12	ND	ND	ND	ND	ND	ND	0.0298	ND
B07-4	04/28/14	12-16	ND	ND	ND	0.00134	ND	ND	0.0233	ND
B07-5	04/28/14	16-20	ND	ND	ND	ND	ND	ND	ND	ND
B07-6	04/28/14	20-24	0.105	ND	ND	0.00114	ND	ND	0.126	ND
B07-7	04/28/14	24-28	0.220	30.7	ND	0.00556	0.000978	0.00705	0.161	ND
B07-8	04/28/14	28-31	6.14	ND	0.00173	0.0586	0.0592	0.590	0.156	0.262
B07-9	04/28/14	31-35	0.252	ND	ND	0.00245	0.0013	0.015	ND	0.132
B08-7	04/28/14	24-26	ND	ND	ND	ND	ND	ND	ND	ND
B09-7	04/28/14	24-28	ND	ND	ND	ND	ND	ND	ND	ND
B09-8	04/28/14	28-32	ND	ND	ND	ND	ND	ND	ND	ND

Table 2 (Cont'd).
Summary of Soil Boring Residual Phase Analytical Results

Sample Identification	Date	Sample Depth (feet)	TPH-GRO ¹	TPH-DRO ²	Benzene ³	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphthalene
B10-6	04/28/14	20-24	ND	ND	ND	ND	ND	ND	0.0101	ND
B10-7	04/28/14	24-28	ND	ND	ND	0.00102	ND	ND	0.0333	ND
B11-6	04/28/14	20-24	ND	ND	ND	ND	ND	ND	ND	ND
B12-3	04/29/14	8-12	ND	7.63	ND	0.0106	0.00216	0.0101	ND	ND
B12-4	04/29/14	12-16	ND	11.6	0.00144	0.0116	0.00141	0.00504	ND	ND
B12-5	04/29/14	16-20	ND	ND	ND	ND	ND	ND	ND	ND
B12-6	04/29/14	20-23	ND	ND	ND	0.00204	ND	0.00263	ND	ND
B12-7	05/05/14	30-35	1,110	75.1	0.124	43.2	35.4	211	0.0571	16.1
B13-7	04/29/14	24-28	ND	ND	ND	0.000943	ND	ND	ND	ND
B13-8	04/29/14	28-31	ND	ND	ND	ND	ND	ND	ND	0.00586
B14-2	04/29/14	4-8	ND	ND	ND	0.00144	ND	ND	ND	ND
B14-3	04/29/14	8-12	ND	ND	ND	0.00147	ND	ND	ND	ND
B14-4	04/29/14	12-16	ND	ND	ND	ND	ND	ND	ND	ND
B14-5	04/29/14	16-20	ND	ND	ND	0.00516	ND	0.00298	ND	ND
B14-6	04/29/14	20-24	ND	ND	ND	ND	ND	ND	ND	ND
B14-7	04/29/14	24-28	ND	ND	ND	ND	ND	ND	ND	ND
B14-8	04/29/14	28-31.5	ND	5.33	ND	0.00162	ND	ND	ND	ND
B15-1	04/29/14	0-6	ND	40.8	ND	0.00639	0.00115	0.00490	ND	ND
B15-2	04/29/14	6-12	ND	6.45	ND	0.00537	0.00136	0.00651	ND	ND
B15-3	04/29/14	12-16	ND	ND	ND	ND	ND	ND	ND	ND
B15-4	04/29/14	16-20	ND	ND	ND	ND	ND	ND	ND	ND
B15-5	04/29/14	20-24	ND	ND	ND	ND	ND	ND	ND	ND
B15-6	04/29/14	24-28	ND	ND	ND	ND	ND	ND	ND	ND
B15-7	04/29/14	28-32	415	48.3	0.132	13.1	11.1	57.8	0.0443	10.2

Table 2 (Cont'd).
Summary of Soil Boring Residual Phase Analytical Results

Sample Identification	Date	Sample Depth (feet)	TPH-GRO ¹	TPH-DRO ²	Benzene ³	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphthalene
B16-6	04/29/14	25-30	ND	ND	ND	ND	ND	ND	ND	ND
B16-7	04/29/14	30-35	ND	ND	ND	ND	ND	ND	ND	ND
B17-4	04/29/14	15-20	ND	ND	ND	ND	ND	ND	ND	ND
B17-5	04/29/14	20-25	ND	ND	ND	ND	ND	ND	ND	ND
B17-6	04/29/14	25-30	ND	ND	ND	ND	ND	ND	ND	ND
B18-3	05/02/14	8-12	ND	ND	ND	ND	ND	ND	ND	ND
B18-4	05/02/14	12-16	0.12	ND	ND	ND	ND	ND	ND	ND
B18-5	05/02/14	16-20	ND	ND	ND	ND	ND	ND	ND	ND
B18-6	05/02/14	20-24	ND	ND	ND	ND	ND	ND	ND	ND
B18-7	05/02/14	24-28	ND	ND	ND	ND	ND	ND	ND	ND
B18-8	05/02/14	28-32	ND	ND	ND	ND	ND	ND	ND	ND
B19-3	05/05/14	8-12	ND	ND	ND	ND	ND	ND	ND	ND
B19-4	05/05/14	12-16	ND	ND	ND	ND	ND	ND	ND	ND
B19-5	05/05/14	16-20	ND	ND	ND	ND	ND	ND	ND	ND
B19-6	05/05/14	20-23	ND	ND	ND	0.00139	ND	ND	ND	ND
B19-7	05/05/14	25-30	ND	ND	ND	ND	ND	ND	ND	ND
B20-4	07/31/14	15-20	ND	ND	ND	ND	ND	ND	ND	ND
B20-5	07/31/14	20-25	ND	ND	ND	ND	ND	ND	ND	ND
B20-6	07/31/14	25-30	ND	ND	ND	ND	ND	ND	ND	ND
B20-7	07/31/14	30-35	ND	ND	ND	ND	ND	ND	ND	ND
B21-4	07/31/14	15-20	ND	ND	ND	ND	ND	ND	ND	ND
B21-5	07/31/14	20-25	ND	ND	ND	0.00186	ND	ND	ND	ND
B21-6	07/31/14	25-30	ND	ND	ND	0.0086	0.000924	0.00613	ND	0.00778
B21-7	07/31/14	30-35	1,420	38.4	3.45	79.7	38.1	202	ND	11.9

Table 2 (Cont'd).
Summary of Soil Boring Residual Phase Analytical Results

Sample Identification	Date	Sample Depth (feet)	TPH-GRO ¹	TPH-DRO ²	Benzene ³	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphthalene
B22-1	07/31/14	0-5	ND	6.97	ND	ND	ND	ND	ND	ND
B22-2	07/31/14	5-10	ND	ND	ND	ND	ND	ND	ND	ND
B22-3	07/31/14	10-15	ND	ND	ND	ND	ND	ND	ND	ND
B22-4	07/31/14	15-20	ND	ND	ND	ND	ND	ND	0.0188	ND
B22-5	07/31/14	20-25	ND	ND	ND	0.0014	ND	ND	0.0265	ND
B22-6	07/31/14	25-26	ND	ND	ND	0.00134	ND	ND	0.027	ND
B22-7	07/31/14	26-30	ND	ND	ND	0.00261	ND	ND	ND	0.049
B23-4	07/31/14	15-20	0.294	ND	ND	0.000975	ND	ND	0.637	ND
B23-5	07/31/14	20-25	1.68	ND	0.0185	0.127	0.0146	0.104	1.16	ND
B23-6	07/31/14	25-29	677	86.1	ND	32.4	21.8	112	ND	9.52
B24-4	08/01/14	15-20	ND	ND	ND	ND	ND	ND	ND	ND
B24-5	08/01/14	20-25	ND	ND	ND	0.00221	ND	ND	0.0174	ND
B24-6	08/01/14	25-30	ND	ND	ND	0.00298	ND	ND	0.0124	ND
B25-1	08/04/14	0-5	ND	ND	0.00168	0.00128	ND	0.00456	0.0967	ND
B25-2	08/04/14	5-10	0.531	ND	0.0026	0.0086	ND	0.00698	0.664	ND
B25-3	08/04/14	10-15	ND	ND	0.0153	0.00833	ND	0.00468	2.23	ND
B25-4	08/04/14	15-20	ND	13.6	ND	0.0119	0.00135	0.00823	2.1	ND
B25-5	08/04/14	20-25	ND	ND	0.0111	0.0404	0.00578	0.0508	3.25	ND
B25-6	08/04/14	25-30	4,760	63.9	12.8	237	121	565	12	29.6
B25-7	08/04/14	30-32	3.67	ND	0.0543	0.559	0.1	0.619	1.27	0.0126
B25-8	08/04/14	32-35	0.77	ND	0.00361	0.0304	0.00766	0.0558	0.739	0.00467
B26-4	08/04/14	15-20	0.385	ND	0.00429	0.0248	0.00286	0.0186	0.555	ND
B26-5	08/04/14	20-25	0.497	ND	0.00327	0.0224	0.00257	0.0229	0.672	0.00624
B26-6	08/04/14	25-28	430	6.42	1.28	28.5	12.8	73.3	ND	5.03

Table 2 (Cont'd).
Summary of Soil Boring Residual Phase Analytical Results

Sample Identification	Date	Sample Depth (feet)	TPH-GRO ¹	TPH-DRO ²	Benzene ³	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphthalene
B26-7	08/04/14	28-30	2.36	ND	0.00111	0.00857	0.0147	0.137	0.016	0.364
B26-8	08/04/14	30-35	354	23.3	ND	2.93	6.81	49.5	ND	13.3
B27-4	08/04/14	15-20	ND	ND	ND	0.00278	0.000942	0.00595	ND	ND
B27-5	08/04/14	20-25	ND	5.35	ND	ND	ND	ND	ND	ND
B27-6	08/04/14	25-27	ND	5.58	ND	ND	ND	ND	ND	ND
B27-7	08/04/14	27-30	ND	ND	ND	ND	ND	ND	ND	ND
B27-8	08/04/14	30-35	ND	ND	ND	ND	ND	ND	ND	ND
B28-4	08/04/14	15-20	ND	ND	ND	ND	ND	ND	ND	ND
B28-5	08/04/14	20-24	ND	ND	ND	ND	ND	ND	ND	ND
B28-6	08/04/14	24-30	ND	ND	ND	ND	ND	0.0032	ND	ND
B28-7	08/04/14	30-35	1,860	129	1.26	73.9	54.8	289	ND	25.6

¹TPH (gasoline range organics) analysis via U.S. EPA SW-846 method 8015B; reported in milligrams per kilogram (mg/kg).

²TPH (diesel range organics) analysis via U.S. EPA SW-846 method 8015B; reported in mg/kg.

³BTEX, MTBE, naphthalene analysis via U.S. EPA SW-846 method 8021B; reported in mg/kg.

⁴ND = Non detected at laboratory method detection limit.

⁵NA = Not analyzed.

Table 3.
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW01 ³	02/27/14	2,962.67	31.54	2,931.13
	03/06/14		31.48	2,931.19
	03/10/14		31.50	2,931.17
	03/12/14		31.21	2,931.46
	03/14/14		31.44	2,931.23
	03/19/14		32.98	2,929.69
	03/28/14		31.33	2,931.34
	04/07/14		31.12	2,931.55
	04/16/14		31.19	2,931.48
	04/25/14		30.68	2,931.99
05/02/14	30.64	2,932.03		
MW01A	05/07/14	2,967.05	30.89	2,936.16
	05/14/14		30.95	2,936.10
	05/23/14		30.99	2,936.06
	06/06/14		31.41	2,935.64
	06/13/14		31.61	2,935.44
	06/18/14		31.78	2,935.27
	06/25/14		31.90	2,935.15
	07/01/14		31.99	2,935.06
	07/10/14		32.14	2,934.91
	07/16/14		32.14	2,934.91
	07/24/14		32.21	2,934.84
	07/30/14		32.34	2,934.71
	08/05/14		32.26	2,934.79
	08/19/14		31.78	2,935.27
	09/25/14	2,966.19	30.69	2,935.50
10/16/14	31.41		2,934.78	
11/05/14	31.41		2,934.78	
MW02	02/27/14	2,967.02	31.80	2,935.22
	03/06/14		31.80	2,935.22
	03/10/14		31.67	2,935.35
	03/12/14		31.53	2,935.49
	03/14/14		31.74	2,935.28
	03/19/14		31.74	2,935.28

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW02 (Cont'd)	03/28/14	2,967.02	31.57	2,935.45
	04/07/14		31.42	2,935.60
	04/16/14		31.52	2,935.50
	04/25/14		31.01	2,936.01
	05/02/14		31.01	2,936.01
	05/07/14		31.07	2,935.95
	05/14/14		31.12	2,935.90
	05/23/14		31.17	2,935.85
	06/06/14		31.60	2,935.42
	06/13/14		31.74	2,935.28
	06/18/14		31.89	2,935.13
	06/25/14		31.97	2,935.05
	07/01/14		32.08	2,934.94
	07/10/14		32.25	2,934.77
	07/16/14		32.29	2,934.73
	07/24/14		32.32	2,934.70
	07/30/14		32.42	2,934.60
	08/05/14	32.45	2,934.57	
	08/19/14	31.97	2,935.05	
	09/24/14	2,966.24	30.93	2,935.31
10/16/14	31.48		2,934.76	
11/05/14	31.65		2,934.59	
MW03	02/27/14	2,966.80	32.61	2,934.19
	03/06/14		32.57	2,934.23
	03/10/14		32.45	2,934.35
	03/12/14		32.33	2,934.47
	03/14/14		32.50	2,934.30
	03/19/14		32.34	2,934.46
	03/28/14		32.32	2,934.48
	04/07/14		32.18	2,934.62
	04/16/14		32.32	2,934.48
	04/25/14		31.93	2,934.87
	05/02/14		31.91	2,934.89
	05/07/14		31.95	2,934.85
	05/14/14		31.96	2,934.84

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW03 (Cont'd)	05/23/14	2,966.80	31.99	2,934.81
	06/06/14		32.31	2,934.49
	06/13/14		32.51	2,934.29
	06/18/14		32.64	2,934.16
	06/25/14		32.76	2,934.04
	07/01/14		32.81	2,933.99
	07/10/14		32.95	2,933.85
	07/16/14		33.00	2,933.80
	07/24/14		32.99	2,933.81
	07/30/14		33.91	2,932.89
	08/05/14		33.17	2,933.63
	08/19/14		32.78	2,934.02
	09/24/14		2,966.05	31.74
	10/16/14	32.78		2,933.27
11/05/14	32.29	2,933.76		
MW04	02/27/14	2,965.67	31.85	2,933.82
	03/06/14		31.75	2,933.92
	03/10/14		31.43	2,934.24
	03/12/14		31.50	2,934.17
	03/14/14		31.64	2,934.03
	03/19/14		NA ⁴	NA
	03/28/14		31.46	2,934.21
	04/07/14		31.33	2,934.34
	04/16/14		31.44	2,934.23
	04/25/14		31.10	2,934.57
	05/02/14		31.03	2,934.64
	05/07/14		31.08	2,934.59
	05/14/14		31.08	2,934.59
	05/23/14		31.16	2,934.51
	06/06/14		31.48	2,934.19
	06/13/14		31.68	2,933.99
	06/18/14		31.82	2,933.85
	06/25/14		31.89	2,933.78
07/01/14	32.03	2,933.64		
07/10/14	32.10	2,933.57		

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW04 (Cont'd)	07/16/14	2,965.67	32.10	2,933.57
	07/24/14		32.01	2,933.66
	07/30/14		32.32	2,933.35
	08/05/14		NA	NA
	08/19/14		NA	NA
	09/24/14		NA	NA
	10/16/14		NA	NA
	11/05/14		32.46	2,933.21
MW05	02/27/14	2,965.57	31.69	2,933.88
	03/06/14		31.57	2,934.00
	03/10/14		31.63	2,933.94
	03/12/14		31.31	2,934.26
	03/14/14		31.47	2,934.10
	03/19/14		NA	NA
	03/28/14		31.28	2,934.29
	04/07/14		31.16	2,934.41
	04/16/14		31.24	2,934.33
	04/25/14		30.89	2,934.68
	05/02/14		30.83	2,934.74
	05/07/14		30.87	2,934.70
	05/14/14		30.88	2,934.69
	05/23/14		30.97	2,934.60
	06/06/14		31.31	2,934.26
	06/13/14		31.53	2,934.04
	06/18/14		31.67	2,933.90
	06/25/14		31.84	2,933.73
	07/01/14		31.87	2,933.70
	07/10/14		31.86	2,933.71
	07/16/14		32.04	2,933.53
	07/24/14		32.06	2,933.51
	07/30/14		32.18	2,933.39
	08/05/14		NA	NA
08/19/14	NA	NA		
09/24/14	NA	NA		

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW05 (Cont'd)	10/16/14	2,965.57	NA	NA
	11/05/14		32.34	2,933.23
MW06	02/27/14	2,967.63	30.88	2,936.75
	03/06/14		30.75	2,936.88
	03/10/14		30.62	2,937.01
	03/12/14		30.47	2,937.16
	03/14/14		30.67	2,936.96
	03/19/14		NA	NA
	03/28/14		30.52	2,937.11
	04/07/14		30.41	2,937.22
	04/16/14		30.49	2,937.14
	04/25/14		29.98	2,937.65
	05/02/14		29.94	2,937.69
	05/07/14		29.97	2,937.66
	05/14/14		30.02	2,937.61
	05/23/14		30.13	2,937.50
	06/06/14		30.51	2,937.12
	06/13/14		30.73	2,936.90
	06/18/14		30.92	2,936.71
	06/25/14		31.06	2,936.57
	07/01/14		31.19	2,936.44
	07/10/14		31.27	2,936.36
	07/16/14		31.38	2,936.25
	07/24/14		31.37	2,936.26
	07/30/14		31.43	2,936.20
08/05/14	NA	NA		
08/19/14	NA	NA		
09/24/14	NA	NA		
10/16/14	31.09	2,936.54		
11/05/14	31.16	2,936.47		
MW07	05/07/14	2,966.80	30.99	2,935.81
	05/14/14		31.01	2,935.79
	05/23/14		31.09	2,935.71
	06/06/14		31.47	2,935.33
	06/13/14		31.66	2,935.14

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW07 (Cont'd)	06/18/14	2,966.80	31.83	2,934.97
	06/25/14		32.10	2,934.70
	07/01/14		32.03	2,934.77
	07/10/14		32.05	2,934.75
	07/16/14		32.08	2,934.72
	07/24/14		32.28	2,934.52
	07/30/14		32.41	2,934.39
	08/05/14		32.40	2,934.40
	08/19/14	31.94	2,934.86	
	09/25/14	2,966.00	30.81	2,935.19
	10/16/14		31.38	2,934.62
	11/05/14		31.57	2,934.43
MW08	05/07/14	2,966.74	32.45	2,934.29
	05/14/14		32.51	2,934.23
	05/23/14		32.60	2,934.14
	06/06/14		32.90	2,933.84
	06/13/14		33.27	2,933.47
	06/18/14		32.47	2,934.27
	06/25/14		33.52	2,933.22
	07/01/14		33.59	2,933.15
	07/10/14		33.64	2,933.10
	07/16/14		33.70	2,933.04
	07/24/14		33.84	2,932.90
	07/30/14		33.95	2,932.79
	08/05/14		NA	NA
	08/19/14		NA	NA
	09/24/14		NA	NA
10/16/14	NA	NA		
11/05/14	34.20	2,932.54		
MW09	05/07/14	2,967.40	33.10	2,934.30
	05/14/14		33.14	2,934.26
	05/23/14		33.22	2,934.18
	06/06/14		33.57	2,933.83
	06/13/14		33.76	2,933.64

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW09 (Cont'd)	06/18/14	2,967.40	33.21	2,934.19
	06/25/14		32.59	2,934.81
	07/01/14		34.09	2,933.31
	07/10/14		34.12	2,933.28
	07/16/14		34.11	2,933.29
	07/24/14		34.10	2,933.30
	07/30/14		34.43	2,932.97
	08/05/14		NA	NA
	08/19/14		NA	NA
	09/24/14		NA	NA
	10/16/14		NA	NA
	11/05/14		34.60	2,932.80
MW10	05/07/14	2,966.76	33.11	2,933.65
	05/14/14		33.42	2,933.34
	05/23/14		33.48	2,933.28
	06/06/14		33.83	2,932.93
	06/13/14		34.11	2,932.65
	06/18/14		33.72	2,933.04
	06/25/14		33.21	2,933.55
	07/01/14		34.39	2,932.37
	07/10/14		34.38	2,932.38
	07/16/14		34.41	2,932.35
	07/24/14		34.39	2,932.37
	07/30/14		35.03	2,931.73
	08/05/14		NA	NA
	08/19/14		NA	NA
	09/24/14		NA	NA
10/16/14	NA	NA		
11/05/14	35.10	2,931.66		
MW11	05/07/14	2,968.11	33.80	2,934.31
	05/14/14		33.83	2,934.28
	05/23/14		33.89	2,934.22
	06/06/14		34.09	2,934.02
	06/13/14		34.39	2,933.72

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW11 (Cont'd)	06/18/14	2,968.11	33.95	2,934.16
	06/25/14		33.03	2,935.08
	07/01/14		34.76	2,933.35
	07/10/14		34.80	2,933.31
	07/16/14		34.76	2,933.35
	07/24/14		34.92	2,933.19
	07/30/14		35.20	2,932.91
	08/05/14		NA	NA
	08/19/14		NA	NA
	09/24/14		NA	NA
	10/16/14		NA	NA
	11/05/14		35.20	2,932.91
MW12	05/07/14	2,966.76	30.80	2,935.96
	05/14/14		30.86	2,935.90
	05/23/14		31.01	2,935.75
	06/06/14		31.48	2,935.28
	06/13/14		31.75	2,935.01
	06/18/14		31.93	2,934.83
	06/25/14		32.05	2,934.71
	07/01/14		32.17	2,934.59
	07/10/14		32.34	2,934.42
	07/16/14		32.31	2,934.45
	07/24/14		32.43	2,934.33
	07/30/14		32.54	2,934.22
	08/05/14		32.57	2,934.19
	08/19/14		32.03	2,934.73
	09/24/14		2,965.94	30.90
	10/16/14	31.70		2,934.24
11/05/14	31.86	2,934.08		
MW13	05/07/14	2,965.32	30.43	2,934.89
	05/14/14		30.49	2,934.83
	05/23/14		30.61	2,934.71
	06/06/14		31.06	2,934.26
	06/13/14		31.33	2,933.99

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW13 (Cont'd)	06/18/14	2,965.32	31.44	2,933.88
	06/25/14		31.58	2,933.74
	07/01/14		31.64	2,933.68
	07/10/14		31.72	2,933.60
	07/16/14		31.74	2,933.58
	07/24/14		31.87	2,933.45
	07/30/14		32.03	2,933.29
	08/05/14		NA	NA
	08/19/14		NA	NA
	09/24/14		NA	NA
	10/16/14		NA	NA
	11/05/14		32.22	2,933.10
MW14	05/07/14	2,966.88	32.13	2,934.75
	05/14/14		32.20	2,934.68
	05/23/14		32.21	2,934.67
	06/06/14		32.47	2,934.41
	06/13/14		32.70	2,934.18
	06/18/14		32.85	2,934.03
	06/25/14		32.92	2,933.96
	07/01/14		33.02	2,933.86
	07/10/14		33.04	2,933.84
	07/16/14		33.17	2,933.71
	07/24/14		33.21	2,933.67
	07/30/14		33.31	2,933.57
	08/05/14		33.33	2,933.55
	08/19/14		32.98	2,933.90
	09/24/14		2,966.11	31.91
	10/16/14	32.66		2,933.45
11/05/14	32.68	2,933.43		
MW15	05/07/14	2,967.82	33.01	2,934.81
	05/14/14		33.05	2,934.77
	05/23/14		33.09	2,934.73
	06/06/14		33.37	2,934.45
	06/13/14		33.55	2,934.27

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW15 (Cont'd)	06/18/14	2,967.82	33.69	2,934.13
	06/25/14		33.81	2,934.01
	07/01/14		33.87	2,933.95
	07/10/14		34.00	2,933.82
	07/16/14		34.21	2,933.61
	07/24/14		34.07	2,933.75
	07/30/14		34.19	2,933.63
	08/05/14		34.20	2,933.62
	08/19/14		33.86	2,933.96
	09/24/14	2,967.06	32.78	2,934.28
	10/16/14		33.35	2,933.71
	11/05/14		33.52	2,933.54
MW16	05/07/14	2,965.29	31.39	2,933.90
	05/14/14		31.58	2,933.71
	05/23/14		31.68	2,933.61
	06/06/14		31.88	2,933.41
	06/13/14		32.59	2,932.70
	06/18/14		32.61	2,932.68
	06/25/14		32.82	2,932.47
	07/01/14		32.85	2,932.44
	07/10/14		32.88	2,932.41
	07/16/14		32.79	2,932.50
	07/24/14		33.16	2,932.13
	07/30/14		33.33	2,931.96
	08/05/14		NA	NA
	08/19/14		NA	NA
	09/24/14		NA	NA
10/16/14	NA	NA		
11/05/14	33.75	2,931.54		
MW17	05/07/14	2,958.98	27.98	2,931.00
	05/14/14		28.35	2,930.63
	05/23/14		28.66	2,930.32
	06/06/14		28.79	2,930.19
	06/13/14		30.05	2,928.93

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW17 (Cont'd)	06/18/14	2,958.98	29.75	2,929.23
	06/25/14		29.51	2,929.47
	07/01/14		30.01	2,928.97
	07/10/14		30.00	2,928.98
	07/16/14		29.95	2,929.03
	07/24/14		29.39	2,929.59
	07/30/14		30.11	2,928.87
	08/05/14		NA	NA
	08/19/14		NA	NA
	09/24/14		NA	NA
	10/16/14		NA	NA
	11/05/14		32.12	2,926.86
MW18	05/07/14	2,969.25	33.31	2,935.94
	05/14/14		33.34	2,935.91
	05/23/14		33.38	2,935.87
	06/06/14		33.73	2,935.52
	06/13/14		33.85	2,935.40
	06/18/14		33.59	2,935.66
	06/25/14		33.79	2,935.46
	07/01/14		34.11	2,935.14
	07/10/14		34.16	2,935.09
	07/16/14		34.10	2,935.15
	07/24/14		34.27	2,934.98
	07/30/14		34.35	2,934.90
	08/05/14		NA	NA
	08/19/14		NA	NA
	09/24/14		NA	NA
	10/16/14		34.23	2,935.02
11/05/14	34.43	2,934.82		
MW19	05/07/14	2,968.77	33.12	2,935.65
	05/14/14		33.14	2,935.63
	05/23/14		33.17	2,935.60
	06/06/14		33.48	2,935.29
	06/13/14		33.63	2,935.14

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW19 (Cont'd)	06/18/14	2,968.77	33.70	2,935.07
	06/25/14		33.91	2,934.86
	07/01/14		33.95	2,934.82
	07/10/14		34.10	2,934.67
	07/16/14		34.09	2,934.68
	07/24/14		34.17	2,934.60
	07/30/14		34.26	2,934.51
	08/05/14		34.30	2,934.47
	08/19/14	33.90	2,934.87	
	09/24/14	2,968.05	32.65	2,935.40
	10/16/14		33.39	2,934.66
	11/05/14		33.57	2,934.48
MW20	08/05/14	2,968.47	35.45	2,933.02
	08/19/14		NA	NA
	09/24/14		NA	NA
	10/16/14		35.41	2,933.06
	11/05/14		35.66	2,932.81
MW21	08/05/14	2,967.61	34.73	2,932.88
	08/19/14		34.35	2,933.26
	09/24/14		33.14	2,934.47
	10/16/14		33.93	2,933.68
	11/05/14		33.54	2,934.07
MW22	08/05/14	2,966.98	32.69	2,934.29
	08/19/14		32.34	2,934.64
	09/24/14		31.11	2,935.87
	10/16/14		31.89	2,935.09
	11/05/14		32.16	2,934.82
MW23	08/05/14	2,966.33	31.99	2,934.34
	08/19/14		31.46	2,934.87
	09/24/14		30.43	2,935.90
	10/16/14		31.04	2,935.29
	11/05/14		31.16	2,935.17

Table 3 (Cont'd).
Summary of Groundwater Elevation Data

Location	Date	Relative Top of Casing Elevation ¹ (feet)	Depth to Groundwater ² (feet)	Relative Groundwater Elevation (feet)
MW24	08/05/14	2,965.79	32.90	2,932.89
	08/19/14		32.49	2,933.30
	09/24/14		31.61	2,934.18
	10/16/14		32.10	2,933.69
	11/05/14		32.38	2,933.41
MW25	08/05/14	2,966.88	NA	NA
	08/19/14		NA	NA
	09/24/14		30.84	2,936.04
	10/16/14		31.50	2,935.38
	11/05/14		31.39	2,935.49
MW26	08/05/14	2,965.54	32.78	2,932.76
	08/19/14		32.41	2,933.13
	09/24/14		31.21	2,934.33
	10/16/14		31.73	2,933.81
	11/05/14		31.94	2,933.60
MW27	08/05/14	2,966.28	31.35	2,934.93
	08/19/14		NA	NA
	09/24/14		29.81	2,936.47
	10/16/14		30.34	2,935.94
	11/05/14		30.47	2,935.81
MW28	08/05/14	2,967.54	NA	NA
	08/19/14		33.00	2,934.54
	09/24/14		32.03	2,935.51
	10/16/14		32.57	2,934.97
	11/05/14		32.73	2,934.81

¹Elevations measured by Fork Mountain Surveying and Mapping, Inc. relative to an approximate site elevation of 2,968 feet.

²If free phase petroleum was observed, depth to groundwater was calculated using a site specific gasoline density of 0.7439 g/ml.

³Elevations measured by Greene prior to permanently abandoning MW01.

⁴NA = Not Applicable.

Table 4.
Summary of Free Product Thicknesses

Well Identification	Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
MW01	02/27/14	31.21	32.50	1.29 ¹
	03/06/14	31.33	31.91	0.58 ¹
	03/10/14	31.34	31.96	0.62 ¹
	03/12/14	31.05	31.67	0.62 ¹
	03/14/14	31.29	31.89	0.60 ¹
	03/19/14	32.90	33.20	0.30 ¹
	03/28/14	31.21	31.68	0.47 ¹
	04/07/14	31.08	31.24	0.16 ¹
	04/16/14	31.15	31.29	0.14 ¹
	04/25/14	30.62	30.84	0.22 ¹
	05/02/14	NA ²	30.64	NA
MW01A	05/07/14	30.56	31.85	1.29
	05/14/14	29.98	33.75	3.77
	05/23/14	29.99	33.90	3.91
	06/06/14	30.34	34.52	4.18
	06/13/14	30.61	34.50	3.89
	06/18/14	31.05	33.90	2.85
	06/25/14	31.12	34.16	3.04
	07/01/14	31.30	33.98	2.68
	07/10/14	31.44	34.18	2.74
	07/16/14	31.63	33.63	2.00
	07/24/14	31.70	33.70	2.00
	07/30/14	31.92	33.55	1.63
	08/05/14	32.00	33.03	1.03
	08/19/14	31.26	33.29	2.03
09/25/14	30.08	32.48	2.40	
10/16/14	30.45	34.21	3.76	
11/05/14	30.70	33.49	2.79	
MW02	02/27/14	30.27	36.24	5.97
	03/06/14	30.38	35.91	5.53
	03/10/14	30.22	35.87	5.65
	03/12/14	30.11	35.65	5.54
	03/14/14	30.41	35.61	5.20
	03/19/14	30.30	35.92	5.62

Table 4 (Cont'd).
Summary of Free Product Thicknesses

Well Identification	Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
MW02 (Cont'd)	03/28/14	30.28	35.30	5.02
	04/07/14	30.18	35.03	4.85
	04/16/14	30.36	34.90	4.54
	04/25/14	29.89	34.27	4.38
	05/02/14	29.97	34.03	4.06
	05/07/14	30.11	33.87	3.76
	05/14/14	30.19	33.82	3.63
	05/23/14	30.25	33.84	3.59
	06/06/14	30.69	34.24	3.55
	06/13/14	30.81	34.44	3.63
	06/18/14	30.98	34.52	3.54
	06/25/14	31.07	34.58	3.51
	07/01/14	31.18	34.70	3.52
	07/10/14	31.35	34.88	3.53
	07/16/14	31.38	34.94	3.56
	07/24/14	31.44	34.86	3.42
	07/30/14	31.54	34.97	3.43
	08/05/14	31.58	34.97	3.39
	08/19/14	31.16	34.32	3.16
	09/25/14	30.19	33.08	2.89
10/16/14	30.59	34.07	3.48	
11/05/14	30.80	34.10	3.30	
MW03	02/27/14	31.50	35.82	4.32
	03/06/14	31.37	36.05	4.68
	03/10/14	31.18	36.13	4.95
	03/12/14	31.32	35.26	3.94
	03/14/14	31.40	35.70	4.30
	03/19/14	31.11	35.90	4.79
	03/28/14	31.030	36.05	5.02
	04/07/14	30.85	36.06	5.21
	04/16/14	31.08	35.91	4.83
	04/25/14	30.60	35.78	5.18
	05/02/14	30.65	35.56	4.91
	05/07/14	30.72	35.51	4.79

Table 4 (Cont'd).
Summary of Free Product Thicknesses

Well Identification	Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
MW03 (Cont'd)	05/14/14	30.67	35.70	5.03
	05/23/14	30.63	35.95	5.32
	06/06/14	30.98	36.18	5.20
	06/13/14	31.23	36.23	5.00
	06/18/14	31.52	35.89	4.37
	06/25/14	31.59	36.15	4.56
	07/01/14	31.70	36.02	4.32
	07/10/14	31.87	36.07	4.20
	07/16/14	31.98	35.95	3.97
	07/24/14	32.02	35.82	3.80
	07/30/14	33.23	35.90	2.67
	08/05/14	32.31	35.65	3.34
	08/19/14	31.87	35.43	3.56
	09/25/14	30.58	35.10	4.52
	10/16/14	31.85	35.47	3.62
11/05/14	31.52	34.52	3.00	
MW07	05/07/14	30.98	31.01	0.03
	05/14/14	NA	31.01	NA
	05/23/14	31.08	31.12	0.04
	06/06/14	31.46	31.50	0.04
	06/13/14	NA	31.66	NA
	06/18/14	NA	31.83	NA
	06/25/14	NA	32.10	NA
	07/01/14	NA	32.03	NA
	07/10/14	NA	32.05	NA
	07/16/14	NA	32.08	NA
	07/24/14	NA	32.28	NA
	07/30/14	NA	32.41	NA
	08/05/14	NA	32.40	NA
	08/19/14	NA	31.94	NA
	09/25/14	30.81	30.82	0.01
10/16/14	NA	31.38	NA	
11/05/14	NA	31.57	NA	

Table 4 (Cont'd).
Summary of Free Product Thicknesses

Well Identification	Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
MW12	05/07/14	30.49	31.70	1.21
	05/14/14	30.43	32.12	1.69
	05/23/14	30.62	32.14	1.52
	06/06/14	31.28	32.05	0.77
	06/13/14	31.64	32.07	0.43
	06/18/14	31.90	32.00	0.10
	06/25/14	32.02	32.15	0.13
	07/01/14	NA	32.17	NA
	07/10/14	32.29	32.49	0.20
	07/16/14	32.30	32.34	0.04
	07/24/14	32.40	32.52	0.12
	07/30/14	32.50	32.64	0.14
	08/05/14	32.53	32.70	0.17
	08/19/14	32.00	32.12	0.12
	09/25/14	30.74	31.37	0.63
	10/16/14	31.48	32.34	0.86
11/05/14	31.79	32.05	0.26	
MW14	05/07/14	31.33	34.44	3.11
	05/14/14	31.44	34.40	2.96
	05/23/14	31.42	34.49	3.07
	06/06/14	31.46	35.40	3.94
	06/13/14	31.72	35.55	3.83
	06/18/14	32.09	35.05	2.96
	06/25/14	32.13	35.22	3.09
	07/01/14	32.28	35.17	2.89
	07/10/14	32.30	35.19	2.89
	07/16/14	32.57	34.90	2.33
	07/24/14	32.57	35.08	2.51
	07/30/14	32.83	34.70	1.87
	08/05/14	33.05	34.15	1.10
	08/19/14	32.36	34.79	2.43
	09/25/14	31.00	34.57	3.57
	10/16/14	31.67	35.55	3.88
11/05/14	32.00	34.66	2.66	

Table 4 (Cont'd).
Summary of Free Product Thicknesses

Well Identification	Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
MW15	05/07/14	32.37	34.88	2.51
	05/14/14	32.39	34.95	2.56
	05/23/14	32.44	34.97	2.53
	06/06/14	32.68	35.39	2.71
	06/13/14	32.85	35.59	2.74
	06/18/14	33.02	35.65	2.63
	06/25/14	33.11	35.83	2.72
	07/01/14	33.18	35.88	2.70
	07/10/14	33.30	36.03	2.73
	07/16/14	33.48	36.32	2.84
	07/24/14	33.39	36.06	2.67
	07/30/14	33.52	36.12	2.60
	08/05/14	33.56	36.07	2.51
	08/19/14	33.26	35.60	2.34
	09/25/14	32.25	34.30	2.05
	10/16/14	32.72	35.18	2.46
11/05/14	32.90	35.33	2.43	
MW19	05/07/14	NA	33.12	NA
	05/14/14	33.10	33.27	0.17
	05/23/14	33.12	33.31	0.19
	06/06/14	33.38	33.78	0.40
	06/13/14	33.56	33.84	0.28
	06/18/14	33.56	34.12	0.56
	06/25/14	33.88	33.98	0.10
	07/01/14	33.90	34.11	0.21
	07/10/14	34.08	34.14	0.06
	07/16/14	34.08	34.12	0.04
	07/24/14	34.12	34.30	0.18
	07/30/14	34.20	34.45	0.25
	08/05/14	34.28	34.36	0.08
	08/19/14	33.86	34.01	0.15
	09/25/14	32.60	32.80	0.20

Table 4 (Cont'd).
Summary of Free Product Thicknesses

Well Identification	Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
MW19 (Cont'd)	10/16/14	33.33	33.55	0.22
	11/05/14	33.46	33.87	0.41
MW21	08/05/14	34.08	36.63	2.55
	08/19/14	33.75	36.09	2.34
	09/25/14	32.60	34.70	2.10
	10/16/14	33.30	35.75	2.45
	11/05/14	33.39	35.96	2.57
MW22	08/05/14	32.19	34.15	1.96
	08/19/14	31.70	34.21	2.51
	09/25/14	30.70	32.30	1.60
	10/16/14	31.15	34.05	2.90
	11/05/14	31.59	33.83	2.24
MW23	08/05/14	31.70	32.85	1.15
	08/19/14	31.19	32.25	1.06
	09/25/14	30.09	31.42	1.33
	10/16/14	30.61	32.27	1.66
	11/05/14	30.74	32.38	1.64
MW24	08/05/14	NA	32.90	NA
	08/19/14	NA	32.49	NA
	09/25/14	NA	31.61	NA
	10/16/14	NA	32.10	NA
	11/05/14	32.36	32.43	0.06
MW25	08/05/14	NA	NA	NA
	08/19/14	NA	NA	NA
	09/25/14	30.79	31.00	0.21
	10/16/14	31.22	32.32	1.10
	11/05/14	31.36	31.46	0.10
MW26	08/05/14	NA	32.78	NA
	08/19/14	31.49	35.09	3.60
	09/25/14	30.19	34.17	3.98
	10/16/14	30.62	34.96	4.34
	11/05/14	30.95	34.82	3.87

Table 4 (Cont'd).
Summary of Free Product Thicknesses

Well Identification	Date	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
MW28	08/05/14	NA	NA	NA
	08/19/14	32.35	34.89	2.54
	09/25/14	31.27	34.25	2.98
	10/16/14	31.75	34.95	3.20
	11/05/14	32.12	34.49	2.37

¹Well screen installed below groundwater; product thickness is likely higher than the measured value.

²NA = Not applicable.

Table 5.
A Summary of Free Product Analytical Results

Sample ID	Date	Specific Gravity	Octane	Paraffin (wt%)	Isoparaffins (wt%)	Aromatics (wt%)	Naphthenics (wt%)	Olefins (wt%)	Benzene (wt%)	Toluene (wt%)	Ethylbenzene (wt%)	Xylenes (wt%)	MTBE (wt%)	Naphthalene (wt%)	ethyl tert-butyl ether (wt%)	tert-Amyl methyl ether (wt%)	diisopropyl ether (wt%)	tert-Amyl alcohol (wt%)
FP01	03/19/14	0.7439	89.530	7.7060	38.8390	42.1237	5.3421	5.9892	0.288	9.626	2.219	12.649	0.02	0.297	ND ¹	ND	ND	ND

¹ND = Non detected at laboratory method detection limits.

Table 6.
Summary of Monitoring Well Dissolved Phase Analytical Results

Well Identification	Date	TPH-GRO ¹	TPH-DRO ²	Benzene ³	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
MW01A	05/14/14	187,000	9,090	4,950	46,300	4,060	22,000	4,530	439
	11/05/14	158,000	NA ⁴	6,470	36,100	3,880	21,500	17,500	438
MW02	05/14/14	190,000	11,300	6,280	42,900	4,170	22,000	11,700	912
	11/05/14	171,000	NA	8,330	43,400	4,030	21,600	17,500	ND ⁵
MW03	05/14/14	122,000	5,550	2,130	27,000	3,100	16,400	1,750	444
	11/05/14	158,000	NA	7,140	42,000	3,850	20,900	8,080	463
MW04	03/12/14	3,870	1,220	483	81.4	30.4	347	1,500	11.7
	05/14/14	4,130	1,220	532	23.2	14.6	303	1,150	ND
	11/05/14	4,920	NA	680	4.25	12.4	375	2,340	ND
MW05	03/12/14	4,080	607	501	47.2	81.9	590	1,350	9.77
	05/14/14	651	120	67.3	3.32	13.1	94.8	228	ND
	11/05/14	5,680	NA	739	51.5	185	1,630	1,460	21.5
MW06	03/12/14	136	230	ND	3.18	2.98	18.7	4.46	ND
	05/14/14	ND	289	ND	ND	ND	ND	1.12	ND
	11/05/14	391	NA	5.24	7.12	4.28	5.06	111	ND
MW07	05/14/14	34,700	4,980	1,090	5,070	1,070	6,360	625	166
	11/05/14	63,200	NA	2,870	13,400	2,030	10,500	3,110	191
MW08	05/14/14	ND	145	ND	ND	ND	ND	1.32	ND
	11/06/14	ND	NA	ND	ND	ND	ND	ND	ND
MW09	05/14/14	ND	ND	ND	ND	ND	ND	ND	ND
	11/06/14	ND	NA	ND	ND	ND	ND	ND	ND
MW10	05/14/14	ND	ND	ND	ND	ND	ND	129	ND
	11/06/14	192	NA	ND	ND	ND	ND	238	ND
MW11	05/14/14	ND	107	ND	ND	ND	ND	ND	ND
	11/06/14	ND	NA	1.2	5.66	ND	ND	10	ND
MW12	05/14/14	124,000	23,700	762	19,800	5,260	28,800	117	710
	11/05/14	71,200	NA	167	5,140	2,390	15,400	33.1	1,250
MW13	05/14/14	ND	ND	ND	ND	ND	ND	9.14	ND
	11/05/14	ND	NA	ND	ND	ND	ND	28.9	ND

Table 6 (Cont'd).
Summary of Monitoring Well Dissolved Phase Analytical Results

Well Identification	Date	TPH-GRO ¹	TPH-DRO ²	Benzene ³	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
MW14	05/14/14	189,000	7,380	7,720	44,800	5,260	29,400	5,850	628
	11/05/14	154,000	NA	7,200	39,200	3,890	21,500	4,830	455
MW15	05/14/14	178,000	8,500	9,310	48,700	5,160	27,500	4,040	547
	11/05/14	158,000	NA	7,890	41,200	3,980	21,700	2,270	472
MW16	05/14/14	ND	ND	ND	ND	ND	ND	8.82	ND
	11/06/14	ND	NA	ND	ND	ND	ND	13.4	ND
MW17	05/14/14	ND	ND	ND	ND	ND	ND	ND	ND
	11/06/14	ND	NA	ND	ND	ND	ND	ND	ND
MW18	05/14/14	ND	234	1.65	ND	ND	3.97	ND	ND
	11/05/14	ND	NA	ND	ND	ND	ND	ND	ND
MW19	05/14/14	29,900	7,220	315	4,400	994	4,680	97.3	179
	11/05/14	17,000	NA	201	2,160	526	3,020	39.3	244
MW20	11/06/14	146	NA	ND	ND	ND	ND	20.4	ND
MW21	11/05/14	154,000	NA	7,710	40,700	3,710	20,200	1,820	1,100
MW22	11/05/14	124,000	NA	5,060	26,200	3,580	18,000	2,030	527
MW23	11/05/14	142,000	NA	3,850	34,600	4,300	22,600	2,080	494
MW24	11/05/14	156,000	NA	5,800	36,700	4,000	23,200	2,350	731
MW25	11/05/14	135,000	NA	3,620	29,300	4,080	21,200	2,680	590
MW26	11/05/14	158,000	NA	6,330	38,900	3,610	19,200	5,400	425
MW27	11/05/14	755	NA	6.61	5.75	2.61	34.7	27.1	6.08
MW28	11/05/14	99,600	NA	2,500	17,700	3,480	17,800	981	483

¹TPH (gasoline range organics) analysis via U.S. EPA SW-846 method 8015B; reported in micrograms per liter (µg/L).

²TPH (diesel range organics) analysis via U.S. EPA SW-846 method 8015B; reported in µg/L.

³BTEX, MTBE, naphthalene analysis via U.S. EPA SW-846 method 8021B; reported in µg/L.

⁴NA = Not applicable.

⁵ND = Non detected at laboratory method detection limit.

Table 7.
Summary of the ¼-Mile Radius Receptor Survey Results

Receptor ID	Name/Address ¹	Well/Spring Location From UST System	Potential Receptor Information, Current Use, Installation Date, & Construction Details
DW01	Meadows of Dan Food Market 2609 Jeb Stuart Highway	~75 feet Northwest	Property maintains a drilled supply well with steel casing located within the store building. The date of installation and additional construction details are unknown.
DW02	Poor Farmer's Market 2616 Jeb Stuart Highway	~135 feet South	Property maintains a drilled supply well with steel casing located within the store building. The well was reportedly installed in 1962. Additional construction details are unknown. A residence is also located on the property, which obtains potable water from the same onsite supply well. Carbon filtration units have been installed as part of the VA DEQ alternate water supply program.
DW03	Jane's County Café 2588 Jeb Stuart Highway	~255 feet Southwest	Property maintains a drilled supply well with steel casing located within a well house behind the café. The date of installation and additional construction details are unknown. Carbon filtration units have been installed as part of the VA DEQ alternate water supply program.
DW04	Janie Stidham Property 2554 Jeb Stuart Highway	~375 feet Southwest	A drilled supply well is located beneath the wooden porch at the DW04 property. The drilled supply well provides potable water to the properties identified as DW04, DW05, and DW06. The date of installation and additional construction details are unknown. Carbon filtration units have been installed as part of the VA DEQ alternate water supply program.
DW05	Commercial Property (For Sale) Formerly Dan River Books 36 Concord Road		
DW06	Cassell Farms Property 10 Concord Road		
DW07	Mountain Meadow Farm & Craft (seasonal) 12134 Squirrel Spur Road	~1,210 feet Southwest	A spring/spring house is located on the DW08 property. The spring reportedly provides potable water to both the DW07 and DW08 properties.
DW08	Greenberry House Yarn 12206 Squirrel Spur Road	~730 feet Southwest	
DW09	Burnette Residence 282 Concord Road	~1,300 feet Southeast	Property maintains a spring/spring house that reportedly provides potable water to the property.
DW10	Meadows of Dan Community Center 2858 Jeb Stuart Highway	~1,350 feet East-Southeast	Property maintains a drilled supply well located within the Meadows of Dan Community Center building. The date of installation and construction details are unknown.
DW11	Agee Residence 2883 Jeb Stuart Highway	~1,415 feet East-Northeast	Property maintains a drilled supply well with PVC casing located on the east side of the residence. The date of installation and additional construction details are unknown.

Table 7 (Cont'd).
Summary of the ¼-Mile Radius Receptor Survey Results

Receptor ID	Name/Address ¹	Well/Spring Location From UST System	Potential Receptor Information, Current Use, Installation Date, & Construction Details
DW12	Spangler Residence 2734 Jeb Stuart Highway	~630 feet East-Southeast	Property reportedly maintains a drilled supply well located on the south side of the residence. The supply well casing is reportedly buried and its exact location is unknown. The date of installation and additional construction details are unknown. Carbon filtration units have been installed as part of the VA DEQ alternate water supply program.
DW13	Stanley Residence 2727 Jeb Stuart Highway	~550 feet East-Northeast	Property maintains a drilled supply well with steel casing located on the south side of the residence. The supply well is reportedly 340 feet deep; however, the date of installation and additional construction details are unknown.
DW14	Private Residence 2685 Jeb Stuart Highway	~325 feet East	Property maintains a drilled supply well with PVC casing located on the south side of the residence. The supply well was reportedly installed in ~2008-2009. Additional construction details are unknown.
DW15	Nancy's Candy Company 2684 Jeb Stuart Highway	~470 feet Southeast	Property maintains a drilled supply well with steel casing located on the south side of the building. The supply well was installed in 1998 to approximately 405 feet below the ground surface. In addition, 105 feet of steel casing was installed and the well was grouted from 0-50 feet. Carbon filtration units have been installed as part of the VA DEQ alternate water supply program.
DW16	Commercial Property Former Mountain House Restaurant 2639 Jeb Stuart Highway	~175 feet East	Property maintains a drilled supply well with steel casing located within a well house on the east side of the property. The supply well was reportedly installed in 1982 to approximately 280 feet below the ground surface. Additional construction details are unknown.
DW17	Commercial Building (Multiple Businesses) 2577 Jeb Stuart Highway Meadows Merchant Building LLC	~200 feet Northwest	Property maintains a drilled supply well with steel casing located on the north side of the property. The top of casing is located below the ground within larger concrete casing. The date of installation and additional construction details are unknown.
DW18	Meadows of Dan Baptist Church 2511 Jeb Stuart Highway	~400 feet Northwest	Property maintains a drilled supply well with steel casing located within the parsonage. The date of installation and additional construction details are unknown.
DW19	Century Link Property 2646 Jeb Stuart Highway	~190 feet Southeast	Property maintains a drilled supply well located on the north side of the property. The top of casing is located below the ground within a manway. The date of installation and additional construction details are unknown.
DW20	Pond	~1,130 feet Southwest	The pond is located on the DW07 property and drains to an intermittent tributary to Tuggle Creek.
DW21	Unnamed Tributary	~950 feet East	Unnamed intermittent tributary to Tuggle Creek.
DW22	Unnamed Tributary	~1,030 feet Southwest	Unnamed intermittent tributary to Tuggle Creek.

¹Addresses are located in Meadows of Dan, VA 24120

Table 8.
Summary of Drinking Water Dissolved Phase Analytical Results

Receptor ID	Sample Date	VOCs ¹	SVOCs ²
DW01	01/31/14	ND ³ for all VOCs via 8260	NA ⁴
	02/10/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	05/14/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	11/07/14	ND for all VOCs via 8260	NA
DW02 (outside hydrant)	01/31/14	MTBE = 76.9; ND for all other VOCs via 8260	NA
	02/07/14	MTBE = 74.6; ND for all other VOCs via 8260	NA
	02/10/14	NA	ND for all SVOCs via 8270
	02/19/14 ⁵	MTBE = 35.1; ND for all other VOCs via 8260	ND for all SVOCs via 8270
	05/15/14 ⁵	MTBE = 56.7 Diisopropyl ether (DIPE) = 0.7 ND for all other VOCs via 8260	NA
	08/26/14 ⁵	MTBE = 33.5; ND for all other VOCs via 8260	NA
	12/18/14 ⁵	MTBE = 14.9; ND for all other VOCs via 8260	NA
	04/23/15 ⁵	MTBE = 21.6; ND for all other VOCs via 8260	NA
DW02 (kitchen faucet)	02/07/14	MTBE = 76.5; ND for all other VOCs via 8260	NA
	02/10/14	NA	ND for all SVOCs via 8270
DW03	01/31/14	Benzene = 14.4 1,2-Dichloroethane = 1.24 MTBE = 38.7 ND for all other VOCs via 8260	NA
	02/07/14	MTBE = 2.71; ND for all other VOCs via 8260	NA
	02/10/14	NA	ND for all SVOCs via 8270
	02/17/14	MTBE = 1.83; ND for all other VOCs via 8260	ND for all SVOCs via 8270
	02/19/14 ⁵	MTBE = 5.0; ND for all other VOCs via 8260	ND for all SVOCs via 8270
	04/16/14 ⁵	MTBE = 4.4; ND for all other VOCs via 8260	NA
	10/30/14 ⁵	TAME = 0.8 Benzene = 6.7 1,2-Dichloroethane = 4.6 MTBE = 63.5 Xylenes = 7.9 ND for all other VOCs via 8260	NA

Table 8 (Cont'd).
Summary of Drinking Water Dissolved Phase Analytical Results

Receptor ID	Sample Date	VOCs ¹	SVOCs ²
DW03 (Cont'd)	04/23/15 ⁵	TAME = 0.6 Benzene = 22.6 1,2-Dichloroethane = 0.6 DIPE = 5.8 MTBE = 44.2 Naphthalene = 1.9 ND for all other VOCs via 8260	NA
	04/30/15 ⁶	ND for all VOCs via 8260	ND for all SVOCs via 8270
	05/12/15 ⁶	ND for all VOCs via 8260	ND for all SVOCs via 8270
	05/12/15 ⁵	TAME = 0.7 Benzene = 44.2 1,2-Dichloroethane = 1.1 DIPE = 7.7 MTBE = 51.4 Naphthalene = 3.0 Xylenes = 46.7 ND for all other VOCs via 8260	Naphthalene = 2.7; ND for all other SVOCs via 8270
DW04 DW05 DW06	03/30/15	Benzene = 21.9 Isopropylbenzene = 0.960 MTBE = 47.6 Naphthalene = 1.81 Xylenes = 26.9 ND for all other VOCs via 8260	Bis(2-ethylhexyl) phthalate = 7.10; ND for all other SVOCs via 8270
	04/20/15	Benzene = 16.0 MTBE = 34.9 Xylenes = 24.3 ND for all other VOCs via 8260	ND for all SVOCs via 8270
	05/18/15 ⁵	TAME = 0.9 Benzene = 62.4 DIPE = 8.3 MTBE = 55.3 Naphthalene = 3.1 Xylenes = 57.3 ND for all other VOCs via 8260	Naphthalene = 2.7; ND for all other SVOCs via 8270
DW07 DW08	03/12/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	05/14/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	11/07/14	ND for all VOCs via 8260	NA
DW09	02/25/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	03/12/14	ND for all VOCs via 8260	Bis(2-ethylhexyl) phthalate = 21.0; ND for all other SVOCs via 8270

Table 8 (Cont'd).
Summary of Drinking Water Dissolved Phase Analytical Results

Receptor ID	Sample Date	VOCs ¹	SVOCs ²
DW10	02/10/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
DW11	02/10/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
DW12	01/31/14	MTBE = 3.62; ND for all other VOCs via 8260	NA
	02/07/14	MTBE = 3.40; ND for all other VOCs via 8260	NA
	02/10/14	NA	ND for all SVOCs via 8270
	03/06/14 ⁵	MTBE = 3.5; ND for all other VOCs via 8260	ND for all SVOCs via 8270
	05/15/14 ⁵	MTBE = 3.4; ND for all other VOCs via 8260	NA
	10/30/14 ⁵	MTBE = 3.5; ND for all other VOCs via 8260	NA
	04/23/15 ⁵	MTBE = 3.7; ND for all other VOCs via 8260	NA
DW13	01/31/14	ND for all VOCs via 8260	NA
	02/10/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	05/14/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	11/07/14	ND for all VOCs via 8260	NA
DW14	01/31/14	ND for all VOCs via 8260	NA
	02/10/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	05/14/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	11/07/14	ND for all VOCs via 8260	NA
DW15	02/10/14	MTBE = 10.9; ND for all other VOCs via 8260	ND for all SVOCs via 8270
	02/17/14	MTBE = 15.5; ND for all other VOCs via 8260	ND for all SVOCs via 8270
	02/19/14 ⁵	MTBE = 15.7; ND for all other VOCs via 8260	ND for all SVOCs via 8270
	03/14/14 ⁵	Acetone = 1,270 2-Butanone (MEK) = 926 MTBE = 15.6 ND for all other VOCs via 8260	NA
	04/16/14 ⁵	MTBE = 18.8; ND for all other VOCs via 8260	NA
	05/15/14 ⁵	MTBE = 18.3; ND for all other VOCs via 8260	NA

Table 8 (Cont'd).
Summary of Drinking Water Dissolved Phase Analytical Results

Receptor ID	Sample Date	VOCs ¹	SVOCs ²
DW15 (Cont'd)	08/26/14 ⁵	MTBE = 25.2; ND for all other VOCs via 8260	NA
	12/18/14 ⁵	MTBE = 17.3; ND for all other VOCs via 8260	NA
	04/23/15 ⁵	MTBE = 21.8; ND for all other VOCs via 8260	NA
DW16	01/31/14	ND for all VOCs via 8260	NA
	02/10/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	07/01/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	08/01/14	Chloroform = 1.84 ND for all VOCs via 8260	ND for all SVOCs via 8270
	09/25/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
DW17	01/31/14	ND for all VOCs via 8260	NA
	02/10/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	11/07/14	ND for all VOCs via 8260	NA
DW18	02/26/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	03/12/14	ND for all VOCs via 8260	Bis(2-ethylhexyl) phthalate = 26.1; ND for all other SVOCs via 8270
DW19	02/25/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	03/12/14	ND for all VOCs via 8260	ND for all SVOCs via 8270
	06/25/14	ND for all VOCs via 8260	NA
	11/20/14	ND for all VOCs via 8260	NA

¹VOCs (Volatile Organic Compounds) analysis via U.S. EPA SW-846 method 8260B; reported in micrograms per liter (µg/L).

²SVOCs (Semi-Volatile Organic Compounds) analysis via U.S. EPA SW-846 method 8270C; reported in µg/L.

³ND = Non Detected at laboratory method detection limits.

⁴NA = Not Analyzed.

⁵Drinking water samples collected on behalf of the VA DEQ AWS program.

⁶Drinking water samples collected by Greene from the DW03 supply well while the property was being provided water from the DW04 property.

Table 9. In Situ Air Sparging with Soil Vapor Extraction¹	
Advantages	<ul style="list-style-type: none"> reduction in VOC vapors below water bearing horizon enhance vapor extraction and downgradient pumping effectiveness
Limitations	<ul style="list-style-type: none"> effectiveness is limited in low permeability or heterogeneous media removal of primarily volatile constituents ability to facilitate vapor- and adsorbed-phase migration maintenance of air distribution in groundwater; availability of performance data is limited
Cleanup Levels & Timing²	<ul style="list-style-type: none"> generally, achieves maximum contaminant levels for VOCs notable reduction in contaminant mass in ~6 months to 1 year [assuming no delays in corrective action and a relatively homogenous, permeable subsurface] notable reduction in contaminant mass in ~6 months to 2 years [assuming minimal delays in corrective actions and a moderately heterogeneous, permeable subsurface]
Costs³	<ul style="list-style-type: none"> ~\$100,000 to \$300,000 [assuming no delays in corrective action and a relatively homogenous, permeable subsurface] ~\$200,000 to \$330,000 [assuming minimal delays in corrective action and a moderately heterogeneous, permeable subsurface]

¹Source: U.S. Environmental Protection Agency, An Overview of Underground Storage Tank Options, Solid Waste and Emergency Response 5403W; EPA 510 F-93-029, October 1993.

²Site specific cleanup standards are determined by the state regulatory agency.

³Costs include necessary equipment and system operation and maintenance for the timeframe specified; adjusted to reflect 2015 pricing.

Table 10. Groundwater Pump & Treat Systems¹	
Advantages	<ul style="list-style-type: none"> reduction in contaminant concentrations and maintenance of areal extent of plume(s)
Limitations	<ul style="list-style-type: none"> effectiveness is limited in aquifers with low permeability potential may require extensive duration periods to achieve maximum efficiency groundwater with a high iron content may affect treatment quality monitoring of water table fluctuations throughout system operation
Cleanup Levels & Timing²	<ul style="list-style-type: none"> ~1 to 3 years [assuming no delays in corrective action and a relatively homogenous, permeable subsurface, and minimal source contaminants] ~2 to 5 years [assuming minimal delays in corrective actions and a moderately heterogeneous, permeable subsurface, and generous source contaminants]
Costs³	<ul style="list-style-type: none"> ~\$250,000 to \$330,000 [assuming no delays in corrective action and a relatively homogenous, permeable subsurface, and minimal source contaminants] ~\$410,000 to \$500,000 [assuming minimal delays in corrective action and a moderately heterogeneous, permeable subsurface, and generous source contaminants]

¹Source: U.S. Environmental Protection Agency, An Overview of Underground Storage Tank Options, Solid Waste and Emergency Response 5403W; EPA 510-F-93-029, October 1993.

²Site specific cleanup standards are determined by the state regulatory agency.

³Costs include necessary equipment and system operation and maintenance for the timeframe specified; adjusted to reflect 2015 pricing.

Table 11. In Situ Bioremediation¹	
Advantages	<ul style="list-style-type: none"> • in-place degradation of contaminants • achieves lower concentrations than pump & treat
Limitations	<ul style="list-style-type: none"> • effectiveness is limited in low permeability or heterogeneous media • ability to transport nutrients and oxygen may be limited by soil and groundwater mineral content or pH • targets biodegradable constituents only
Cleanup Levels & Timing²	<ul style="list-style-type: none"> • generally, achieves maximum contaminant levels • achieves > or = 90% reduction of biodegradable constituents • ~90% reduction in 6 months to 1 year [assuming no delays in corrective action and a relatively homogenous, permeable subsurface] • ~90% reduction in 6 months to 4 years [assuming minimal delays in corrective actions and a moderately heterogeneous, permeable subsurface] • additional system operation time required for hydrocarbons maintaining a composition with a greater density
Costs³	<ul style="list-style-type: none"> • ~\$250,000 to \$410,000 [assuming no delays in corrective action and a relatively homogenous, permeable subsurface] • ~\$330,000 to \$820,000 [assuming minimal delays in corrective action and a moderately heterogeneous, permeable subsurface]

¹Source: U.S. Environmental Protection Agency, An Overview of Underground Storage Tank Options, Solid Waste and Emergency Response 5403W; EPA 510-F-93-029, October 1993.

²Site specific cleanup standards are determined by the state regulatory agency.

³Costs include necessary equipment and system operation and maintenance for the timeframe specified; adjusted to reflect 2015 pricing.

Table 12. Dual-Phase Extraction¹	
Advantages	<ul style="list-style-type: none"> • reduction in contaminant concentrations and maintenance of areal extent of plume(s) • ability to remove VOCs from soils • ability to dewater an area facilitating additional recovery of VOCs from soils • effective in low permeability or heterogeneous media
Limitations	<ul style="list-style-type: none"> • potential for treatment of vapor recovery stream • groundwater with a high iron content may affect treatment quality • monitoring of water table fluctuations throughout system operation
Cleanup Levels & Timing²	<ul style="list-style-type: none"> • notable reduction in contaminant mass in ~6 months to 1 year [assuming no delays in corrective action and a relatively homogenous, permeable subsurface] • notable reduction in contaminant mass in ~6 months to 2 years [assuming minimal delays in corrective actions and a moderately heterogeneous, permeable subsurface]
Costs³	<ul style="list-style-type: none"> • ~\$130,000 to \$300,000 [assuming no delays in corrective action and a relatively homogenous, permeable subsurface] • ~\$200,000 to \$320,000 [assuming minimal delays in corrective action and a moderately heterogeneous, permeable subsurface]

¹Source: U.S. Environmental Protection Agency, An Overview of Underground Storage Tank Options, Solid Waste and Emergency Response 5403W; EPA 510 F-93-029, October 1993.

²Site specific cleanup standards are determined by the state regulatory agency.

³Costs include necessary equipment and system operation and maintenance for the timeframe specified; adjusted to reflect 2015 pricing.

Table 13. Spray Aeration Vapor Extraction with Internal Combustion Engine	
Advantages	<ul style="list-style-type: none"> utilizes/treats recovered vapors to provide power for the internal combustion engine reduction in contaminant concentrations and maintenance of areal extent of plume(s) ability to remove VOCs from soils ability to dewater an area facilitating additional recovery of VOCs from soils effective in low permeability or heterogeneous media
Limitations	<ul style="list-style-type: none"> potential for treatment of liquid recovery stream monitoring of water table fluctuations throughout system operation not effective in low permeability or heterogeneous media supplemental fuel required when recovered vapor phase concentrations decrease significant maintenance required due to use of an internal combustion engine
Cleanup Levels & Timing¹	<ul style="list-style-type: none"> notable reduction in contaminant mass in ~6 months to 1 year [assuming no delays in corrective action and a relatively homogenous, permeable subsurface] notable reduction in contaminant mass in ~6 months to 2 years [assuming minimal delays in corrective actions and a moderately heterogeneous, permeable subsurface]
Costs²	<ul style="list-style-type: none"> ~\$100,000 to \$300,000 [assuming no delays in corrective action and a relatively homogenous, permeable subsurface] ~\$1500,000 to \$400,000 [assuming minimal delays in corrective action and a moderately heterogeneous, permeable subsurface]

¹Site specific cleanup standards are determined by the state regulatory agency.

²Costs include necessary equipment and system operation and maintenance for the timeframe specified; adjusted to reflect 2015 pricing.

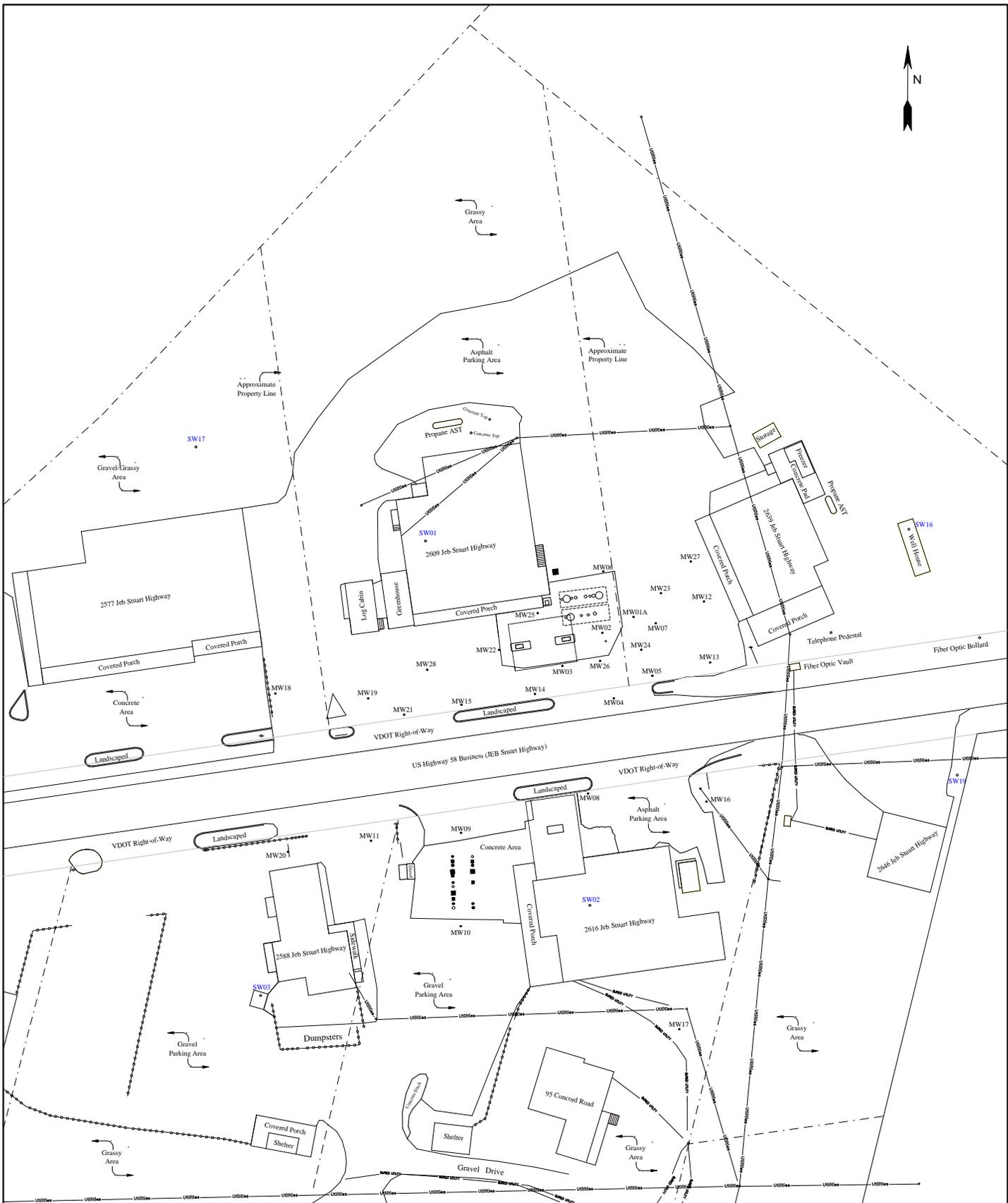
Table 14
Summary of Operational Monitoring & Sampling Schedule

Monitoring Schedule				
Location	Frequency		Methods	
RCP System	Twice weekly inspections for 1 st month; Weekly inspections for remainder of first quarter; Twice monthly thereafter		Routine system operation and maintenance	
Groundwater Monitoring Wells	Twice weekly inspections for 1 st month; Weekly inspections for remainder of first quarter; Twice monthly thereafter		Gauge wells	
Sampling Schedule				
Location	Frequency	Parameters	Methods	Media
RCP & Air Stripper Vapor Effluents	Weekly for 1 st month; monthly thereafter	TVPH, BTEX, & MTBE	Method TO18	Vapor
RCP System Water Influent & Effluent	Weekly for 1 st month; monthly thereafter	TPH-GRO, BTEX, MTBE, Naphthalene, pH for effluent	Methods 8015B & 8021B	Water
Groundwater Monitoring Wells	Quarterly	TPH-GRO, BTEX, MTBE, Naphthalene	Methods 8015B and 8021B	Water
Supply Wells	Quarterly	VOCs, SVOCs	Methods 8260B & 8270C	Water

APPENDIX B

Maps

Site Map
Aerial Map
Topographic Map
Initial Abatement Measures Report Soil Sample Location Map
Soil Boring Location Map
Monitoring Well Location Map
Potential Receptors Location Map
SCRA Potentiometric Surface Map
SCRA Potentiometric Surface Map
SCRA Free Phase Plume Map
SCRA TPH-GRO Isoconcentration Map
SCRA TPH-DRO Isoconcentration Map
SCRA Benzene Isoconcentration Map
SCRA Toluene Isoconcentration Map
SCRA Ethylbenzene Isoconcentration Map
SCRA Xylenes Isoconcentration Map
SCRA MTBE Isoconcentration Map
SCRA Naphthalene Isoconcentration Map
SCRA Total BTEX Isoconcentration Map
IA CAP IMP Potentiometric Surface Map
IA CAP IMP Free Phase Plume Map
IA CAP IMP TPH-GRO Isoconcentration Map
IA CAP IMP Benzene Isoconcentration Map
IA CAP IMP Toluene Isoconcentration Map
IA CAP IMP Ethylbenzene Isoconcentration Map
IA CAP IMP Xylenes Isoconcentration Map
IA CAP IMP MTBE Isoconcentration Map
IA CAP IMP Naphthalene Isoconcentration Map
IA CAP IMP Total BTEX Isoconcentration Map
Remediation System Groundwork Map



GREENE ENVIRONMENTAL SERVICES LLC.

TITLE:	SITE MAP	
SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005A
CLIENT:	T&M, M of D, LLC	DATE: 06/16/2015
COMMENTS:		DRAWN BY: FMS, MAF

Aerial Map

Meadows of Dan Food Market
2609 Jeb Stuart Highway
Meadows of Dan, Virginia 24120



© 2013 Google



ENVIRONMENTAL SERVICES LLC
200 Buckwheat Lane, Rocky Mount, Virginia 24151

Office: 540-483-3311 or 800-215-2596
Fax: 540-483-3381

www.greene-environmental.com

PATRICK COUNTY, VIRGINIA

Source: Google Earth

Scale: Not to Scale

Project: Corrective Action Plan

Client: T&M, M of D, L.L.C.

Greene Job #: FMMD1005

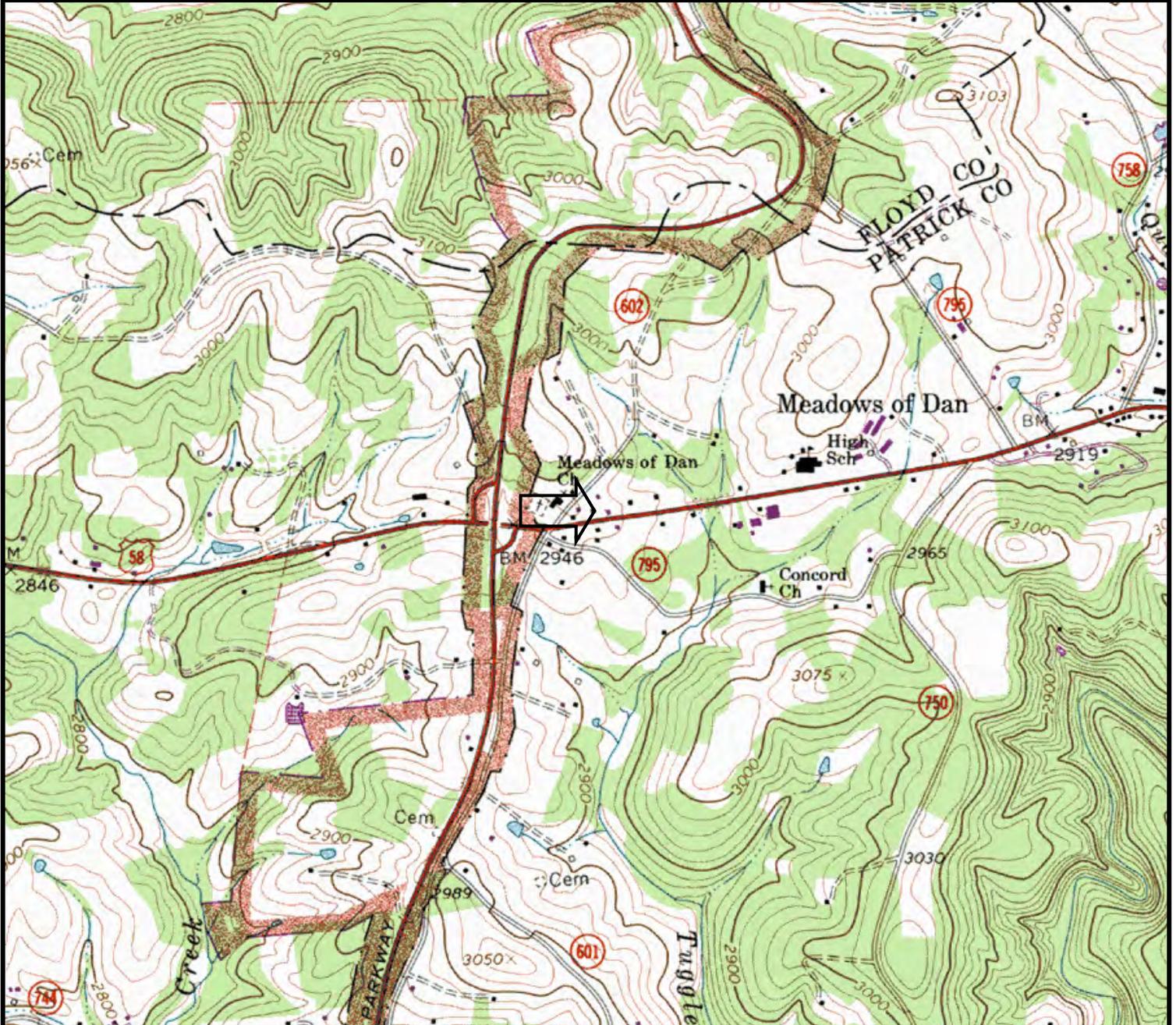
Date: June 17, 2015



Latitude:
036.7353972° N
Longitude:
080.4077838° W

Topographic Map

Meadows of Dan Food Market
2609 Jeb Stuart Highway
Meadows of Dan, Virginia 24120



ENVIRONMENTAL SERVICES LLC
200 Buckwheat Lane, Rocky Mount, Virginia 24151

Office: 540-483-3311 or 800-215-2596

Fax: 540-483-3381

www.greene-environmental.com

MEADOWS of DAN, VIRGINIA

Source: U.S.G.S. Topographic Map of the Meadows of Dan Quadrangle, Virginia, 7.5 Minute Series (1968, revised 1985)

Scale: Not to Scale Contour Interval: 20 Feet
Vertical Datum: National Geodetic Vertical Datum 1929

Horizontal Datum: North American Datum 1927

Project: Corrective Action Plan

Client: T&M, M of D, L.L.C.

Greene Job #: FMMD1005

Date: June 17, 2015



Latitude: 036.7353972° N
Longitude: 080.4077838° W



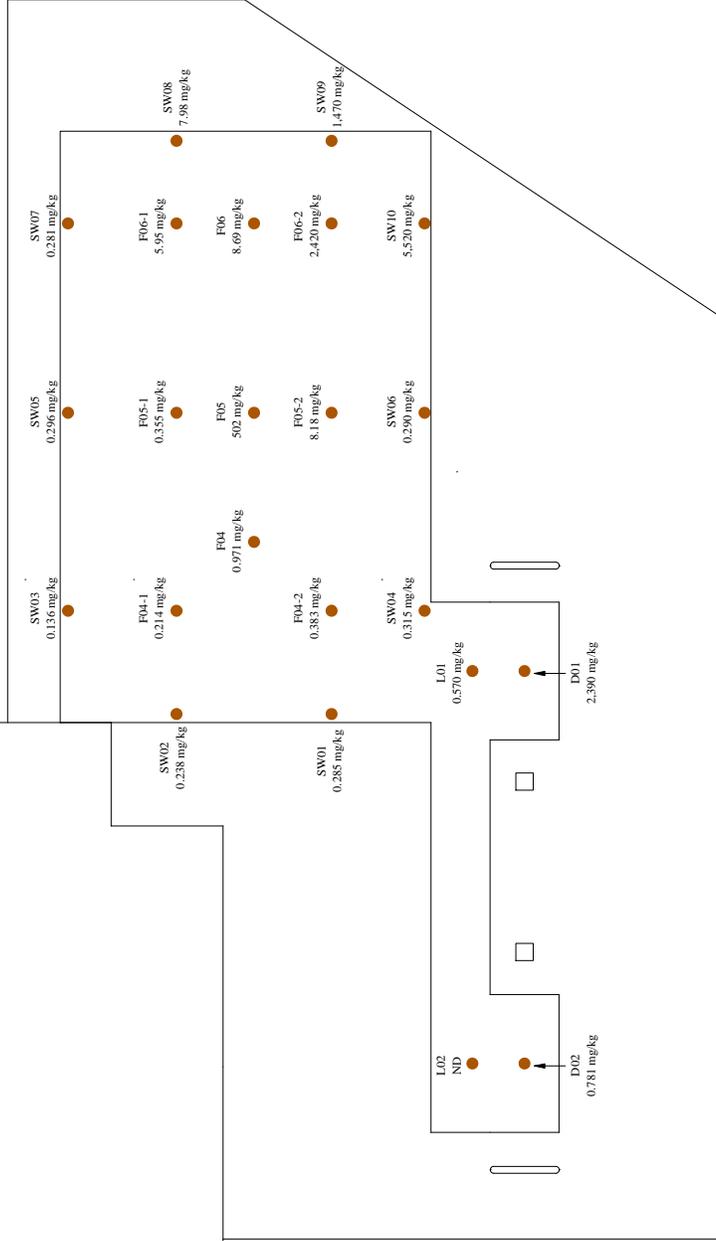
Asphalt
Parking Area

Asphalt
Parking Area

Asphalt
Parking Area

Meadows of Dan Food Market

Steps



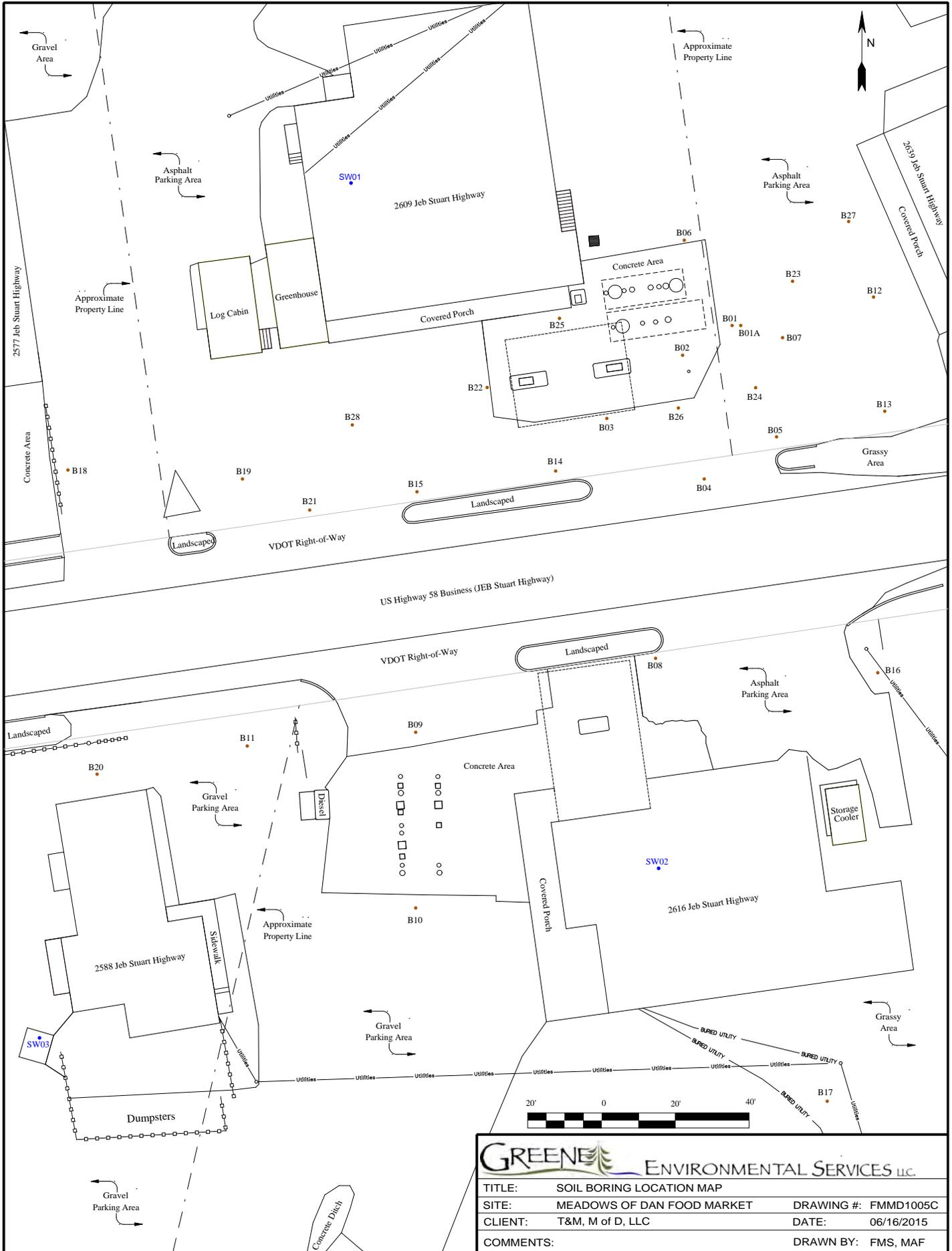
TITLE: IAMR SOIL SAMPLE LOCATION MAP

SITE: MEADOWS OF DAN FOOD MARKET DRAWING #: FMMD1005B

CLIENT: T&M, M of D, LLC DATE: 06/16/2015

COMMENTS: DRAWN BY: MAF





TITLE:	SOIL BORING LOCATION MAP	
SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005C
CLIENT:	T&M, M of D, LLC	DATE: 06/16/2015
COMMENTS:		DRAWN BY: FMS, MAF



TITLE:	MONITORING WELL LOCATION MAP	
SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005D
CLIENT:	T&M, M of D, LLC	DATE: 06/16/2015
COMMENTS:	DRAWN BY: FMS, MAF	

Potential Receptors Location Map

Meadows of Dan Food Market
 2609 Jeb Stuart Highway
 Meadows of Dan, Virginia 24120

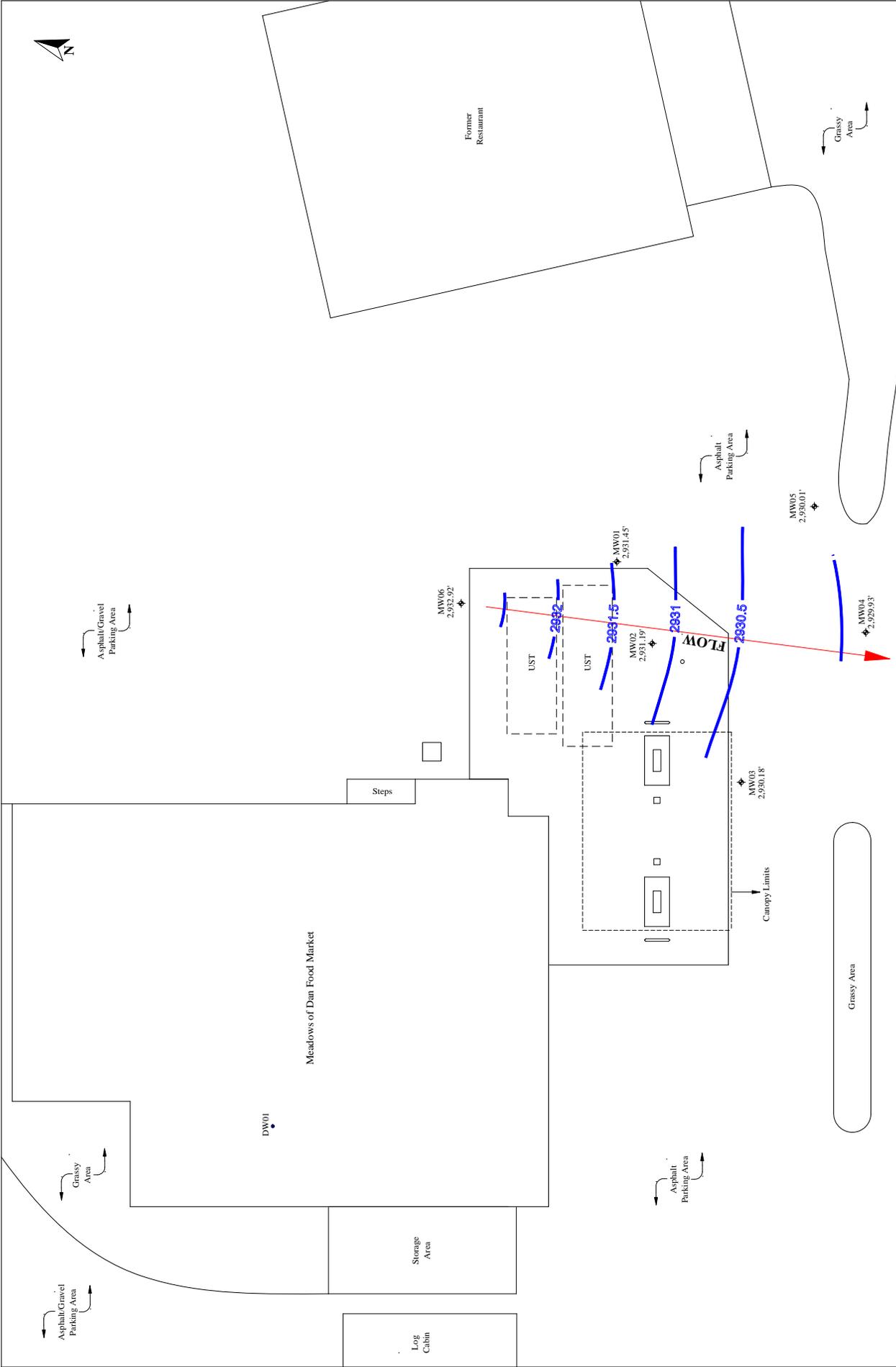


GREENE
 ENVIRONMENTAL SERVICES LLC.
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 Office: 540-483-3311 or 800-215-2596
 Fax: 540-483-3381
 www.greene-environmental.com

**PATRICK COUNTY,
 VIRGINIA**
 Source: Google Earth
 Scale: Not to Scale

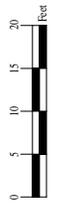
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 Client: T&M, M of D, L.L.C.
 Greene Job #: FMMD1005
 Date: June 17, 2015

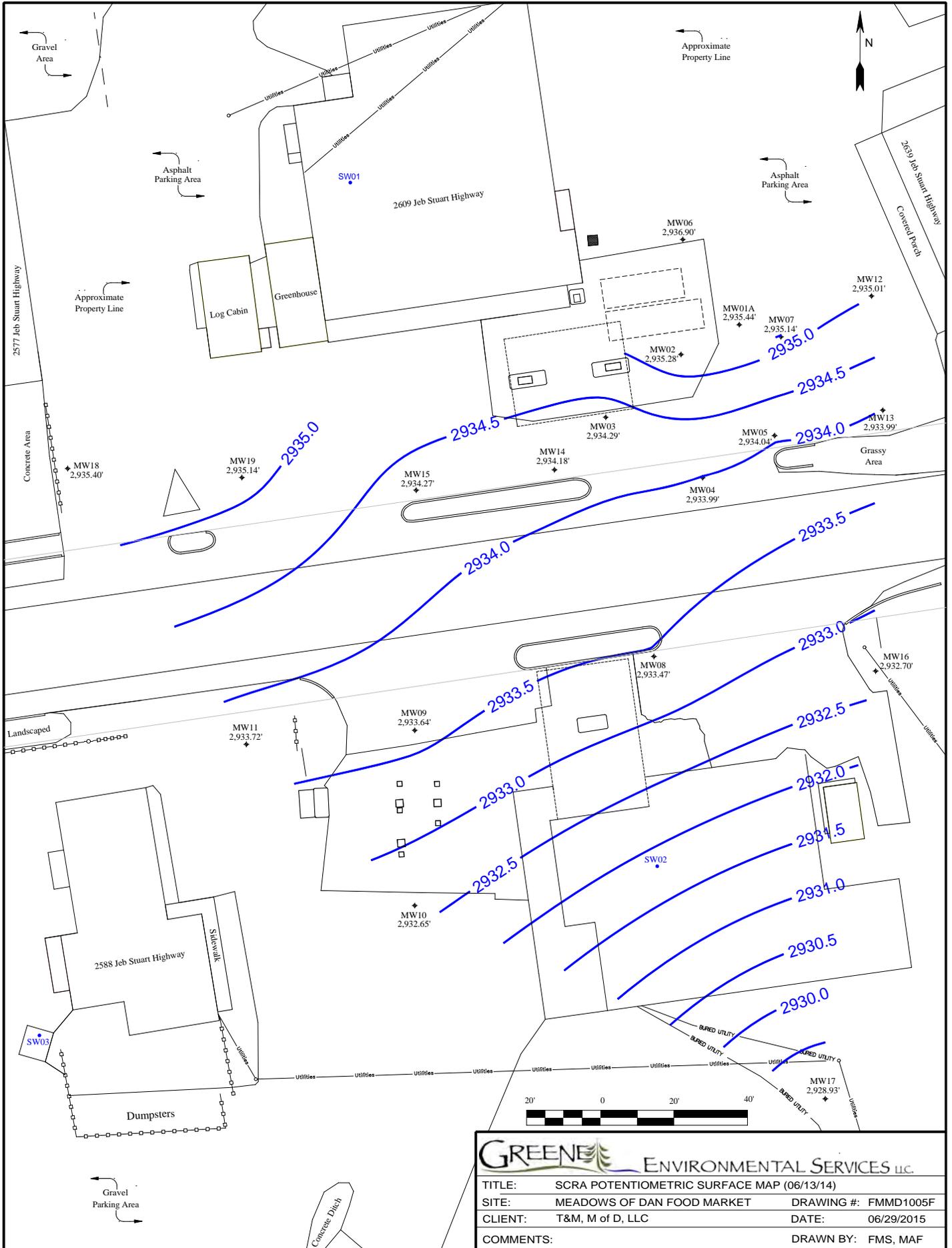

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 Longitude: 080.4077838° W

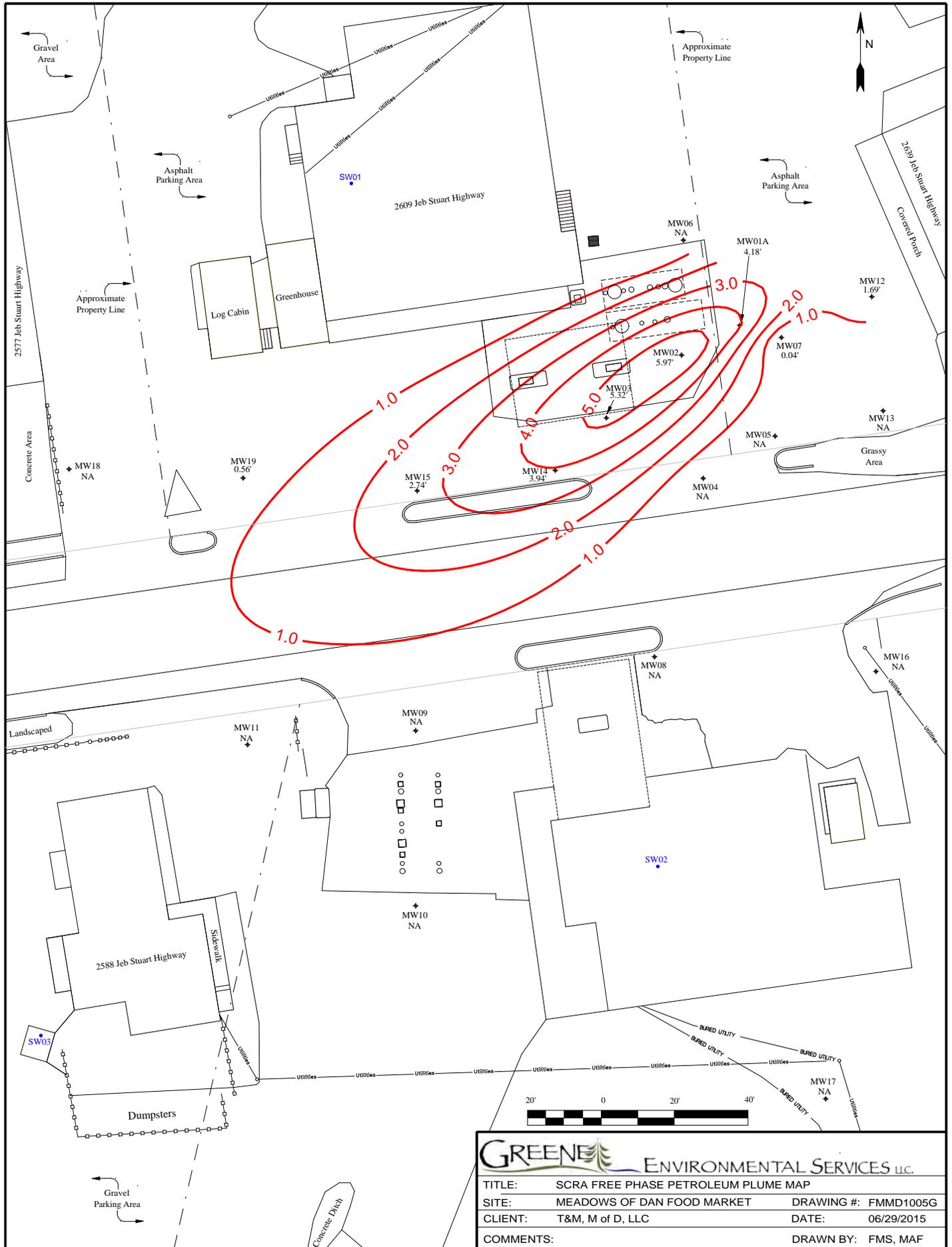


TITLE: SCR POTENTIOMETRIC SURFACE MAP (03/12/2014)
 SITE: MEADOWS OF DAN FOOD MARKET DRAWING #: FMMD1005E
 CLIENT: T&M, M of D, LLC DATE: 06/29/2015
 COMMENTS: DRAWN BY: MAF

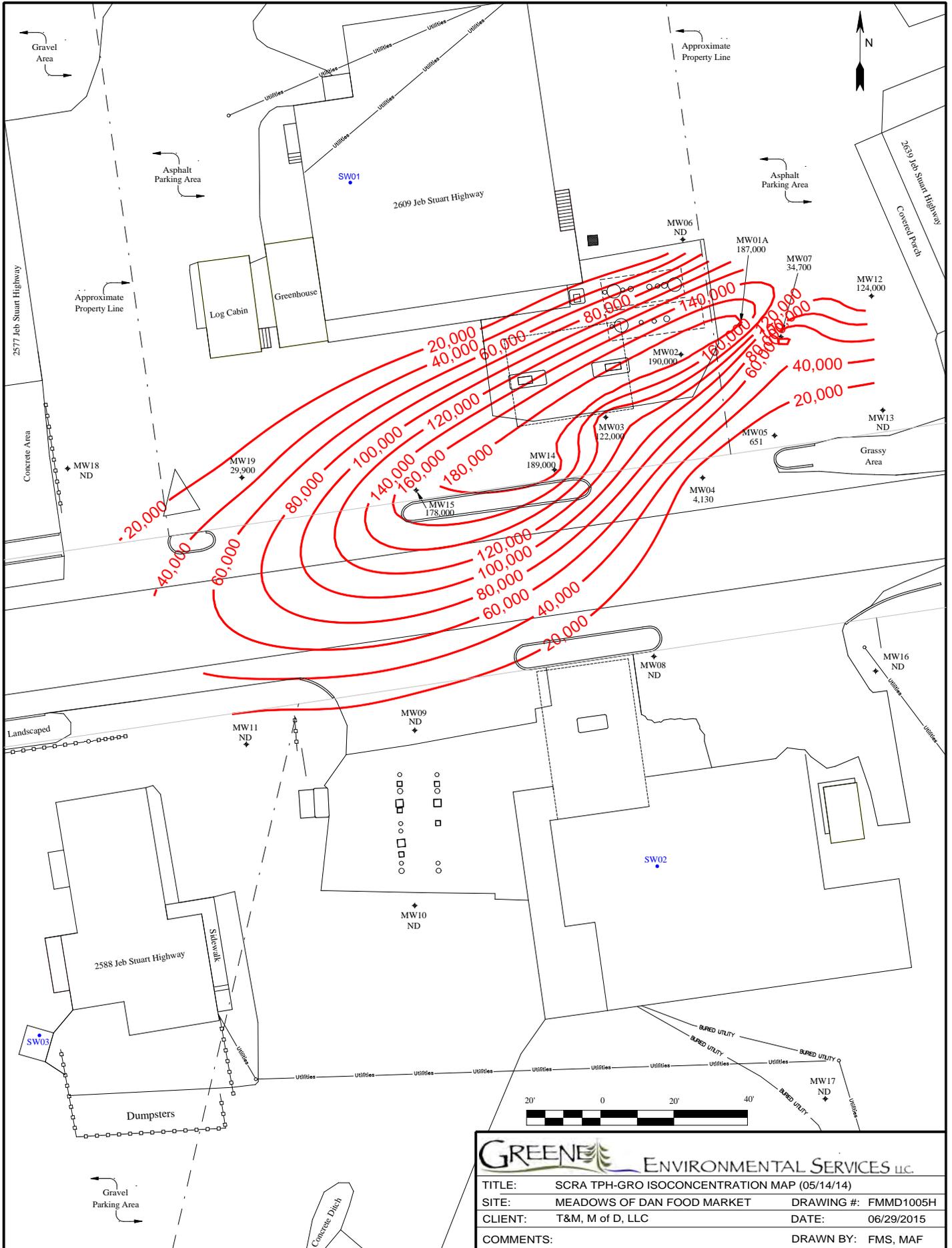
← Job Stuart Highway →



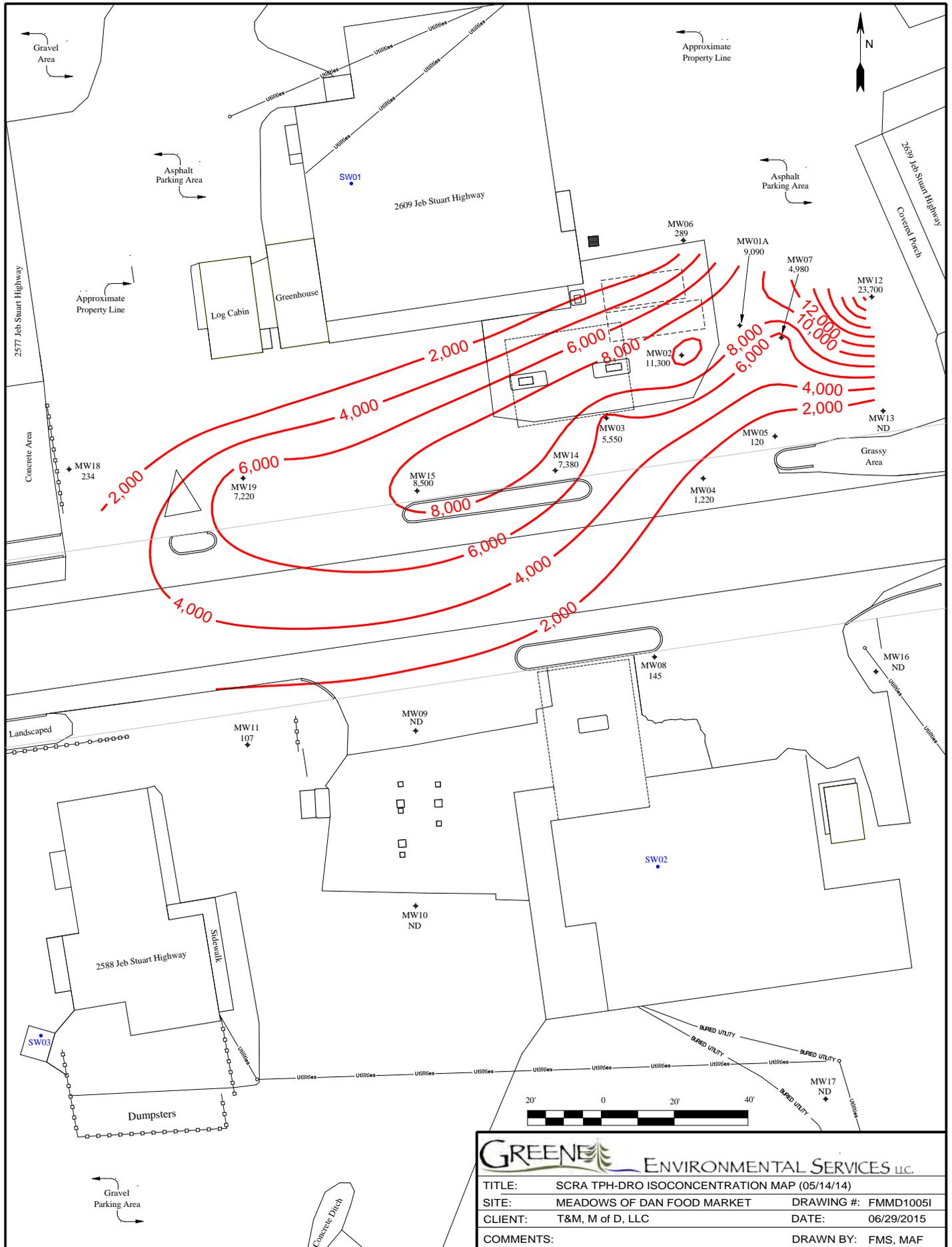




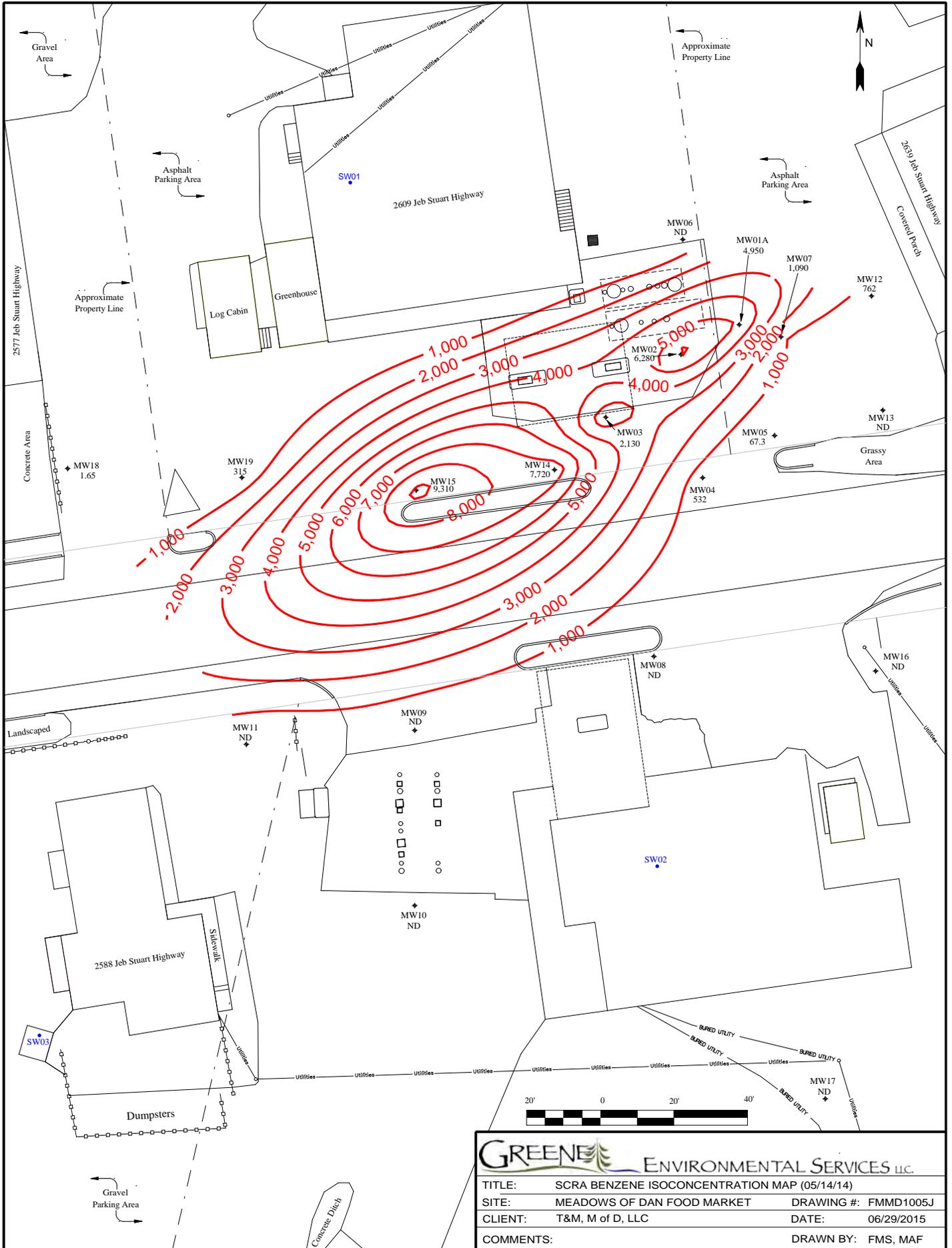
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CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:		DRAWN BY: FMS, MAF



TITLE:	SCRA TPH-GRO ISOCONCENTRATION MAP (05/14/14)	
SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005H
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:	DRAWN BY: FMS, MAF	



TITLE:	SCRA TPH-DRO ISOCONCENTRATION MAP (05/14/14)	
SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD10051
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:		DRAWN BY: FMS, MAF

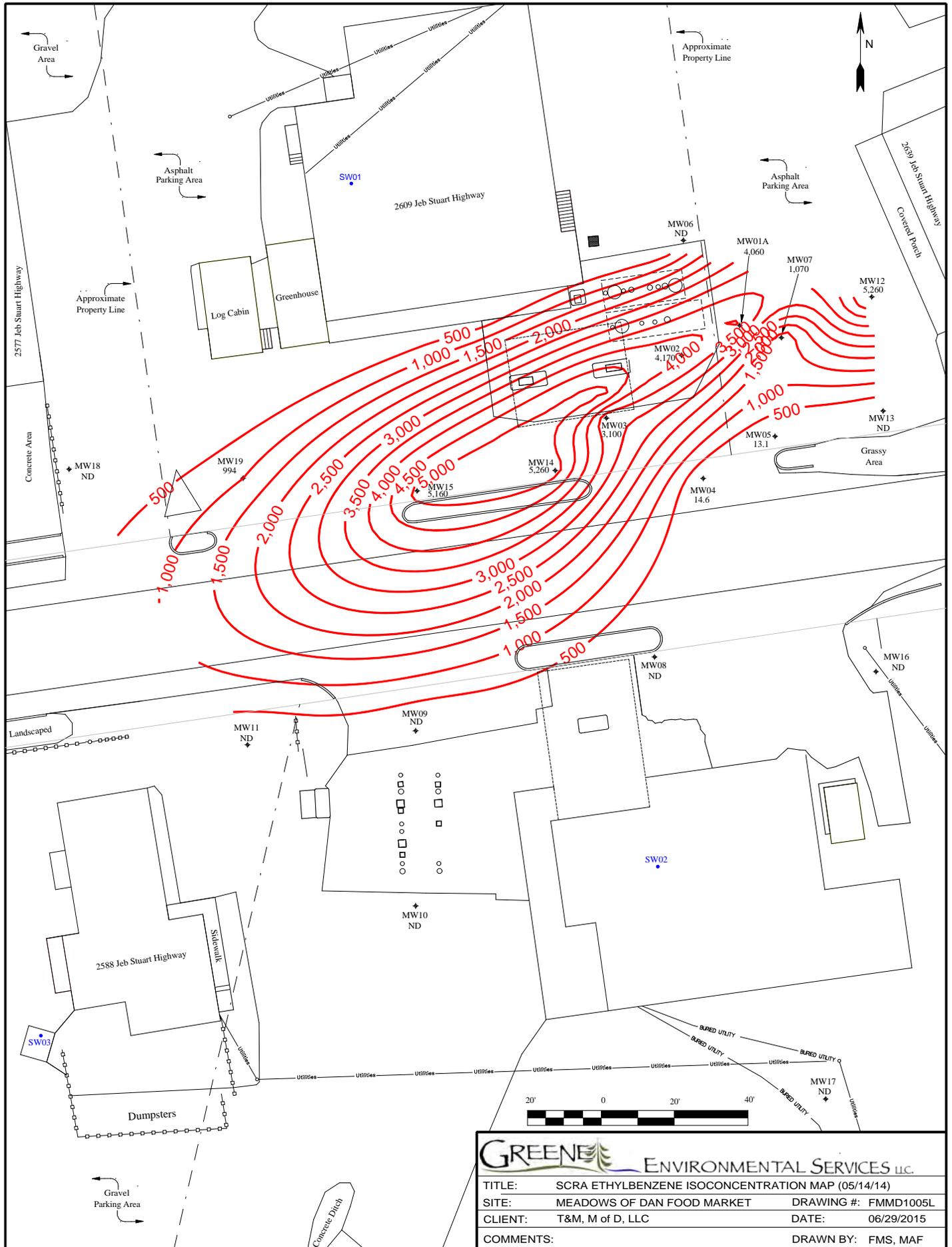


GREENE ENVIRONMENTAL SERVICES LLC.

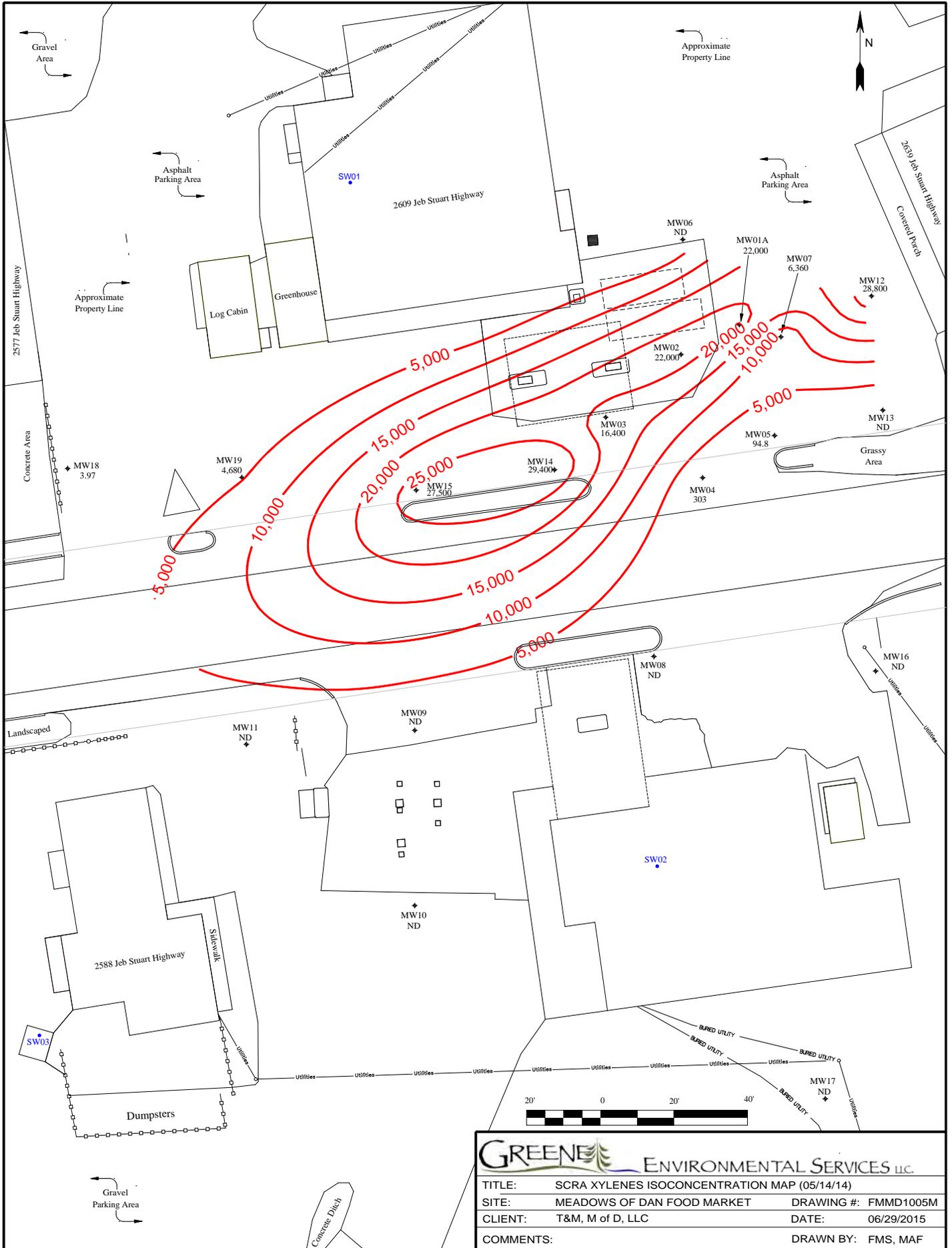
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SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005J
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:		DRAWN BY: FMS, MAF



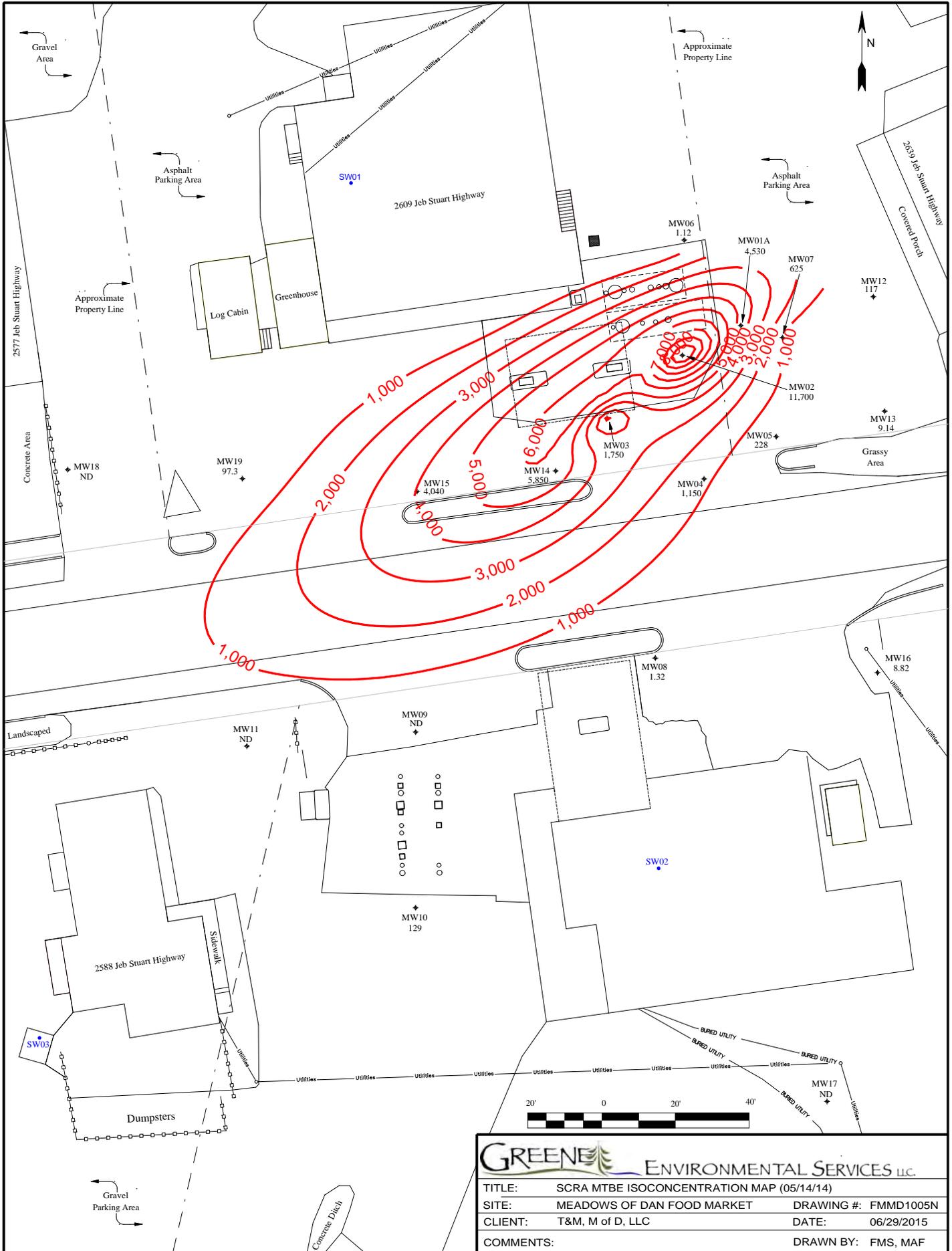
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SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005K
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:	DRAWN BY: FMS, MAF	



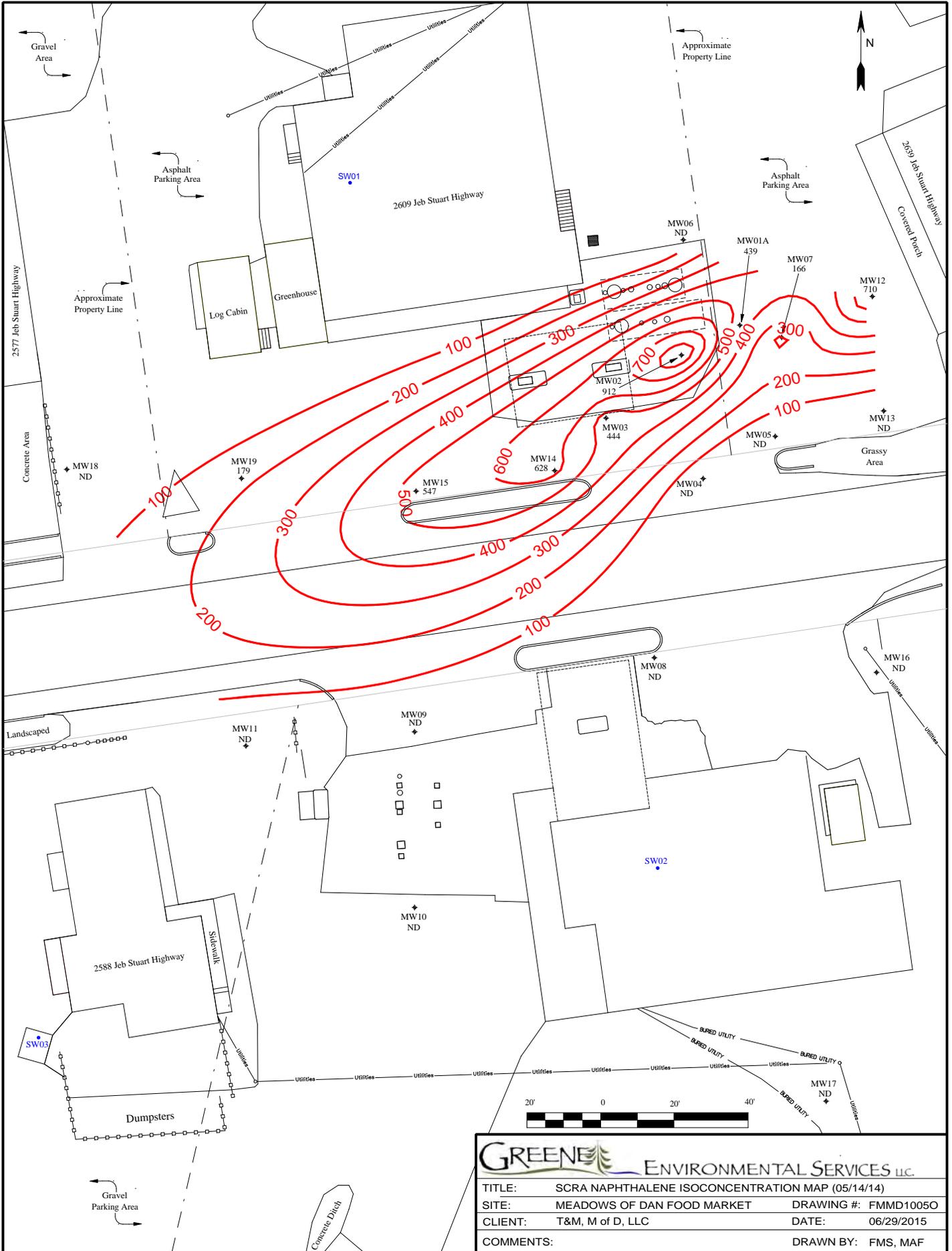
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SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005L
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:		DRAWN BY: FMS, MAF



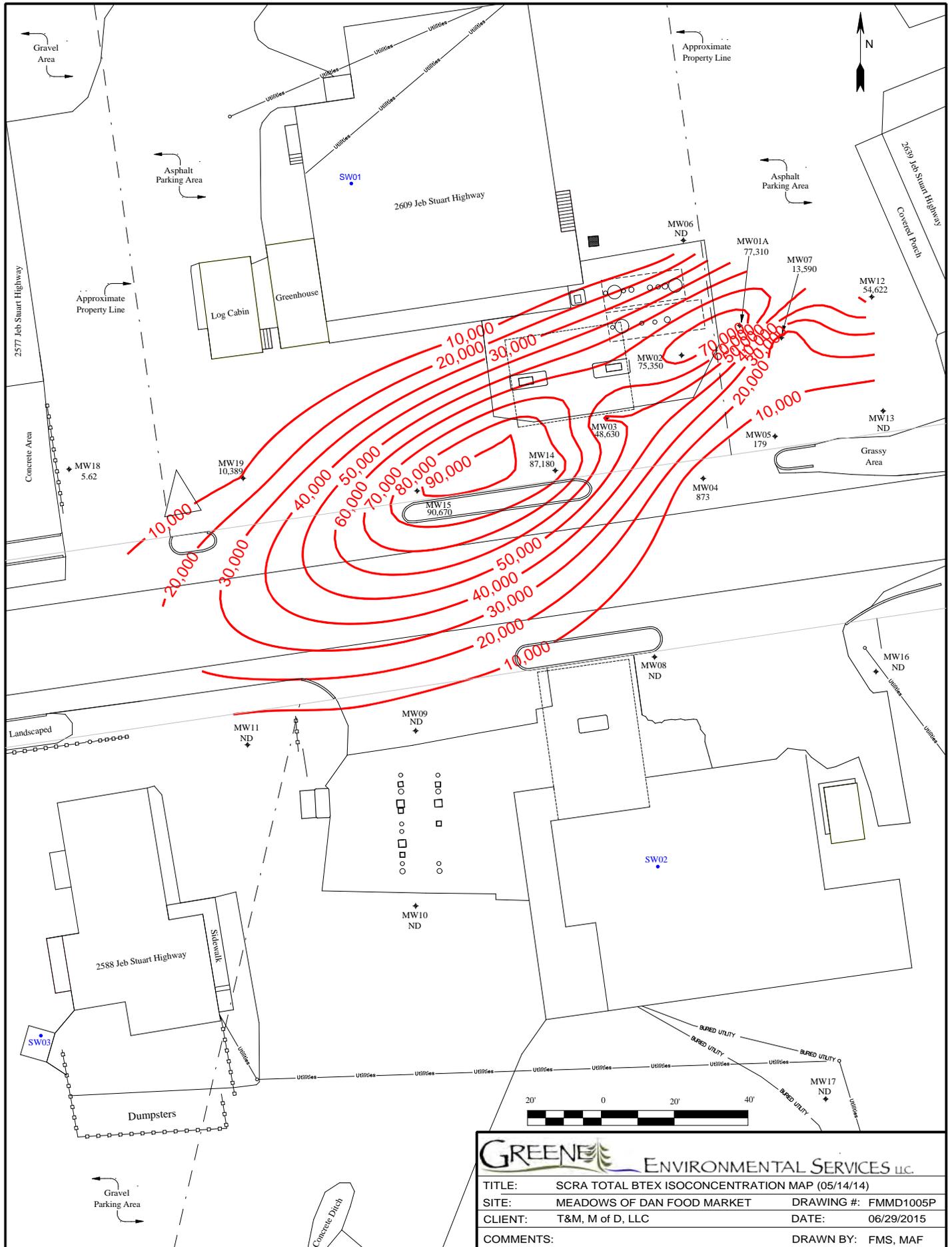
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SITE:	MEADOWS OF DAN FOOD MARKET
CLIENT:	T&M, M of D, LLC
COMMENTS:	
DRAWING #:	FMMD1005M
DATE:	06/29/2015
DRAWN BY:	FMS, MAF



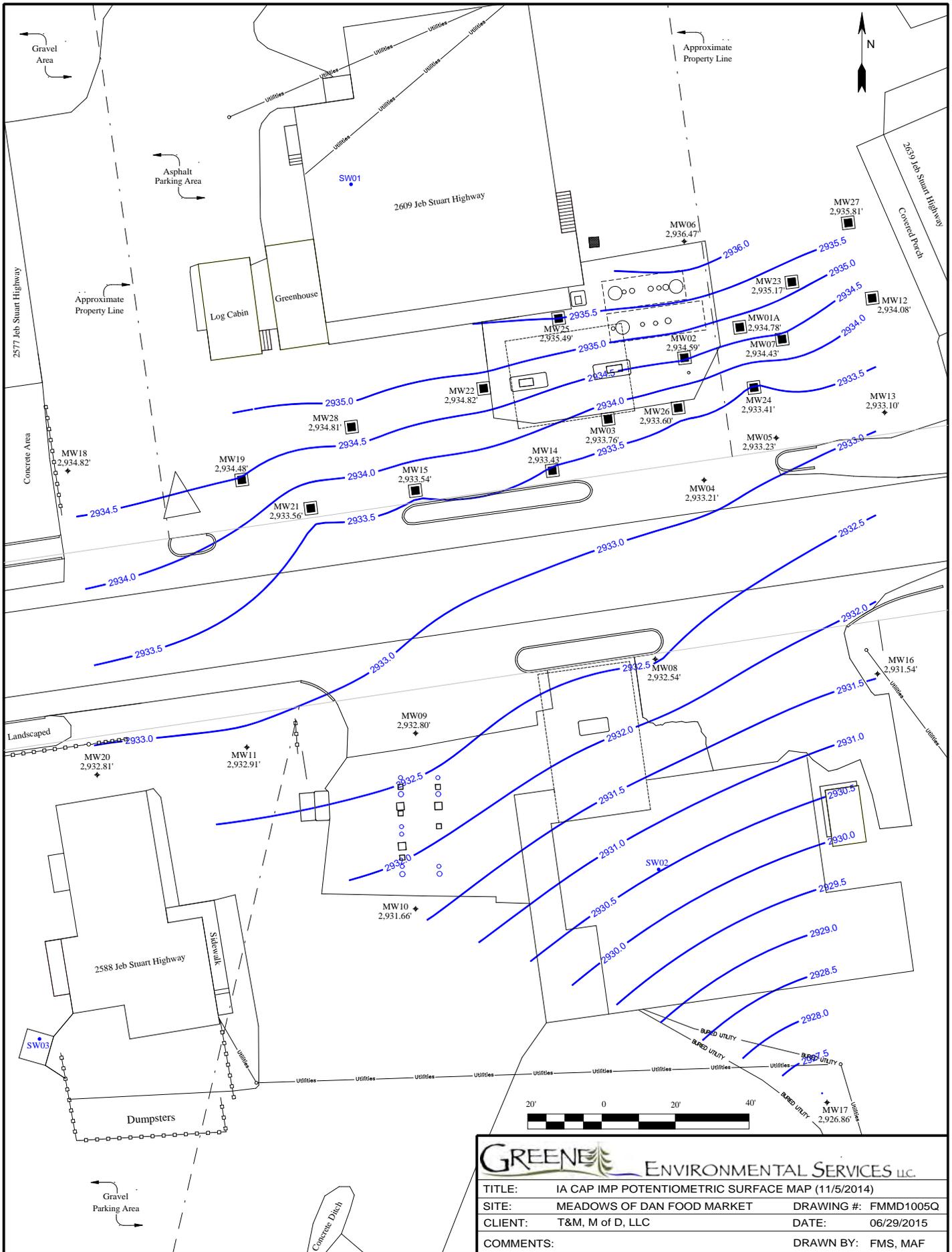
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CLIENT:	T&M, M of D, LLC
COMMENTS:	
DRAWING #:	FMMD1005N
DATE:	06/29/2015
DRAWN BY:	FMS, MAF

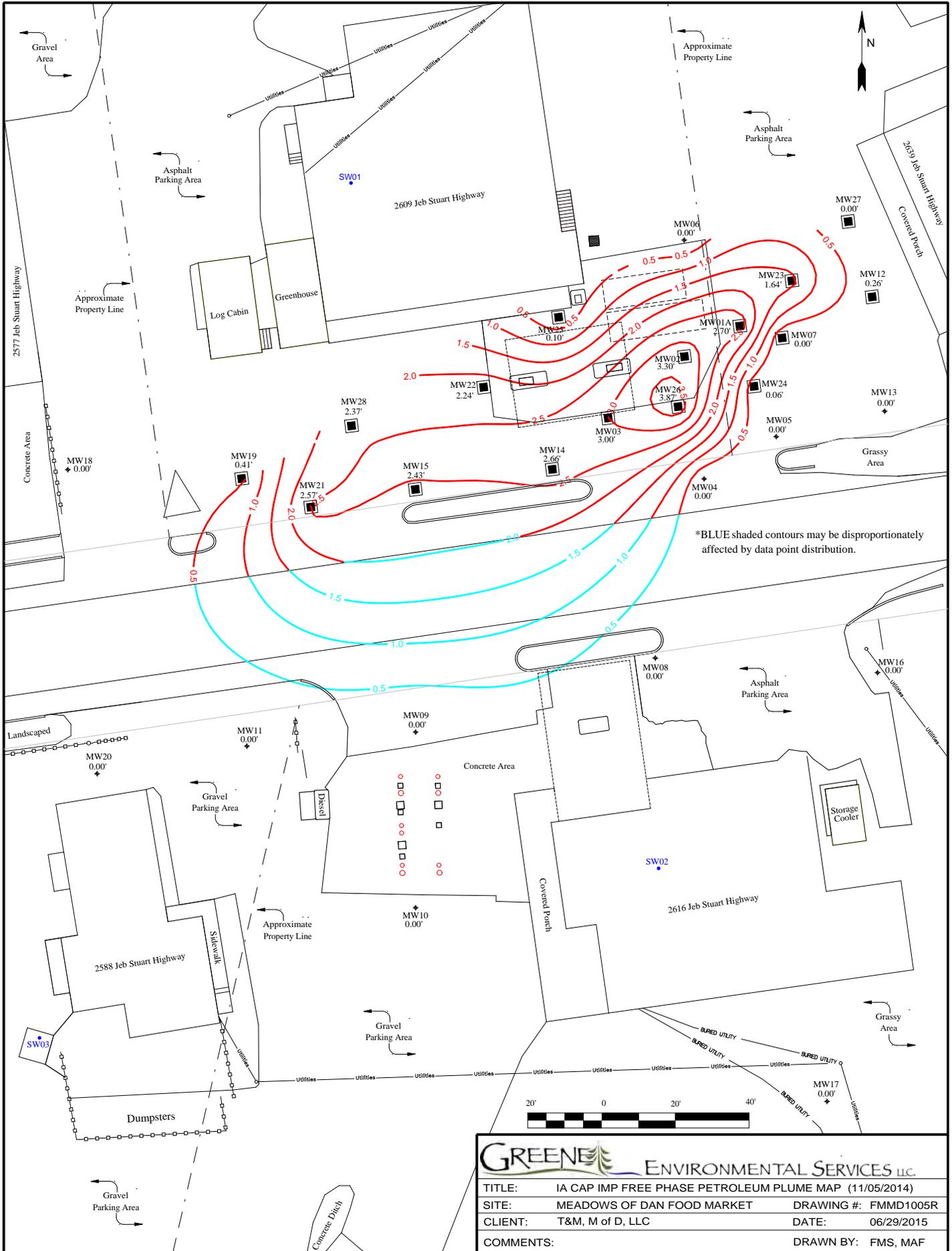


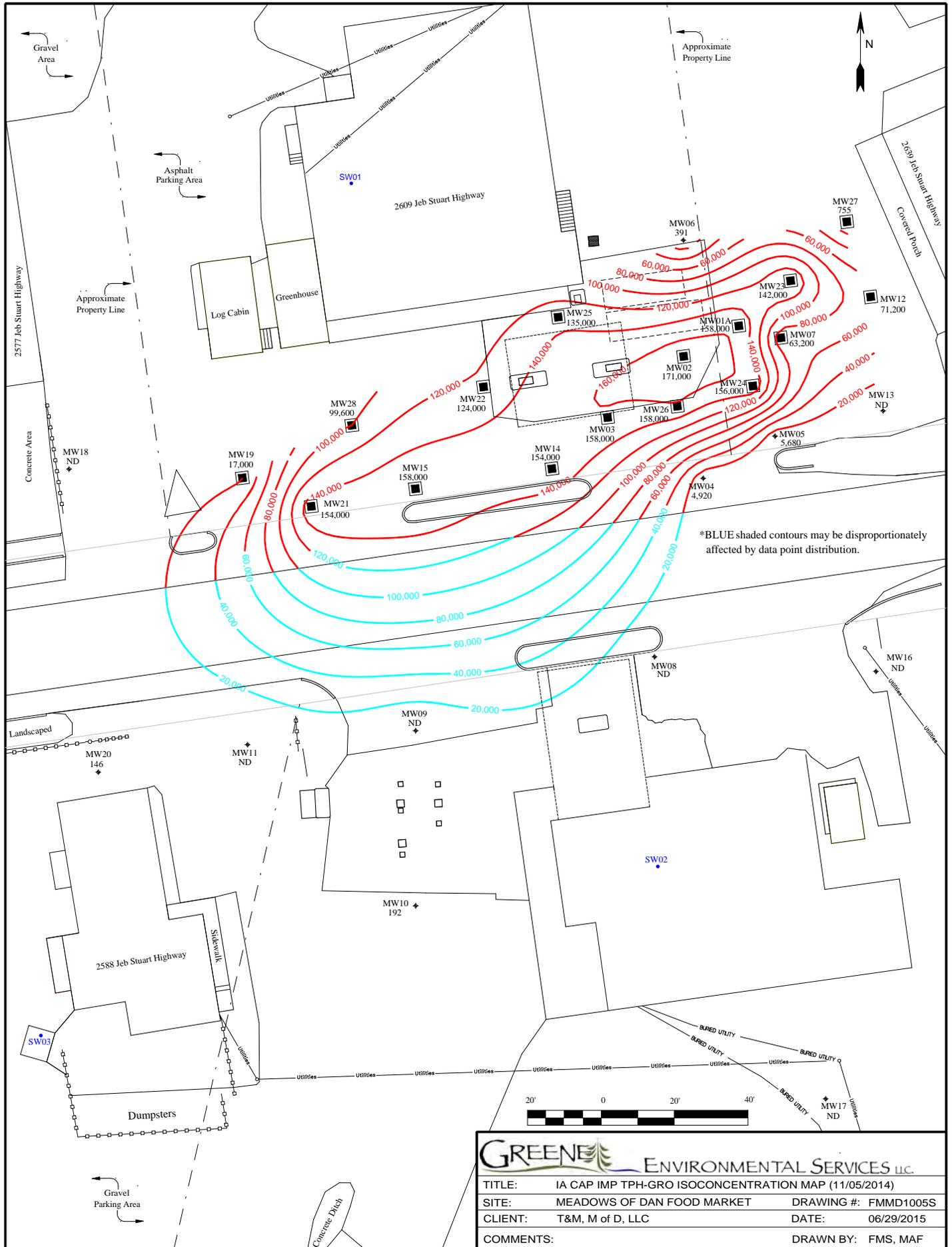
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CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:		DRAWN BY: FMS, MAF



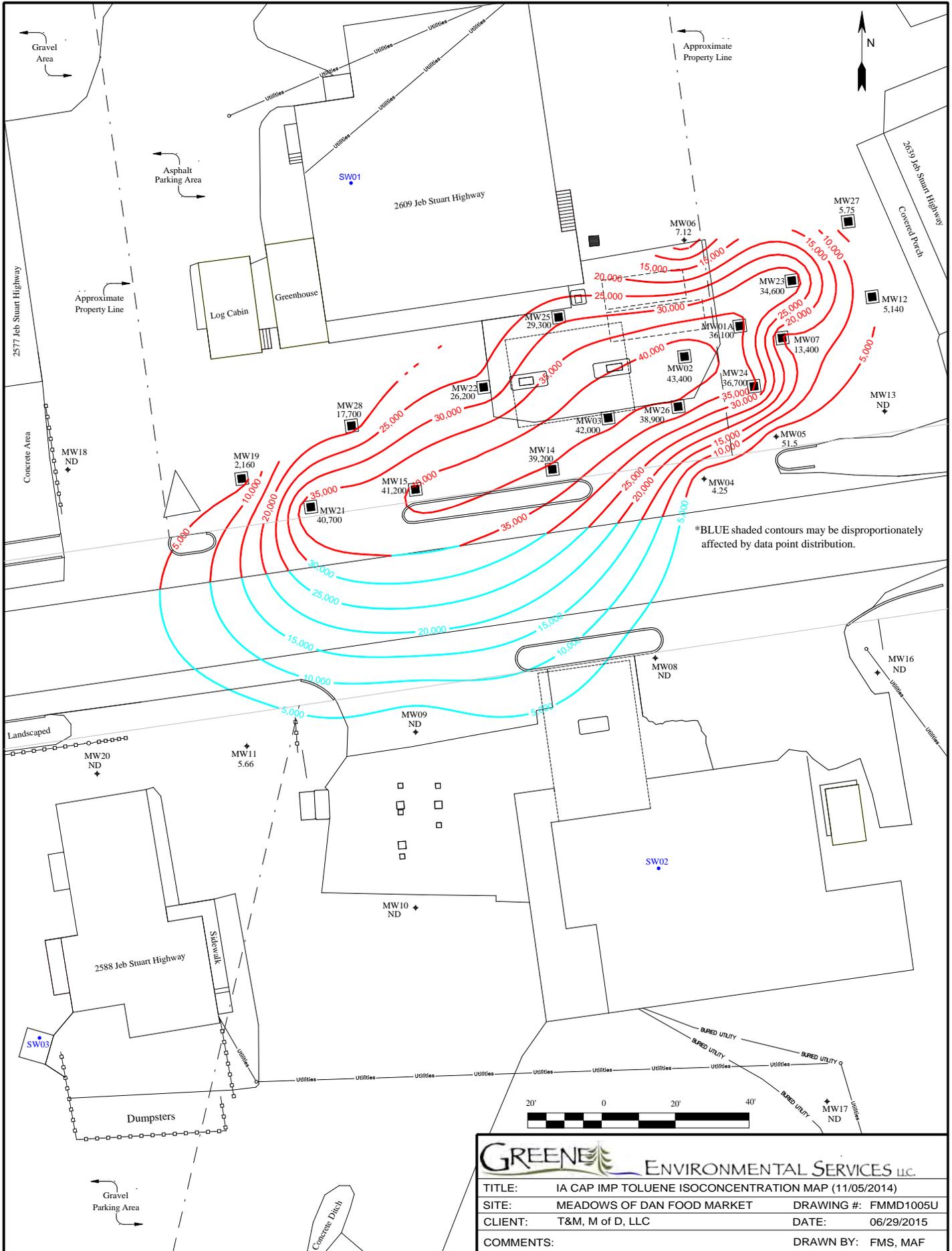
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SITE:	MEADOWS OF DAN FOOD MARKET	DATE:	06/29/2015
CLIENT:	T&M, M of D, LLC	DRAWN BY:	FMS, MAF
COMMENTS:			





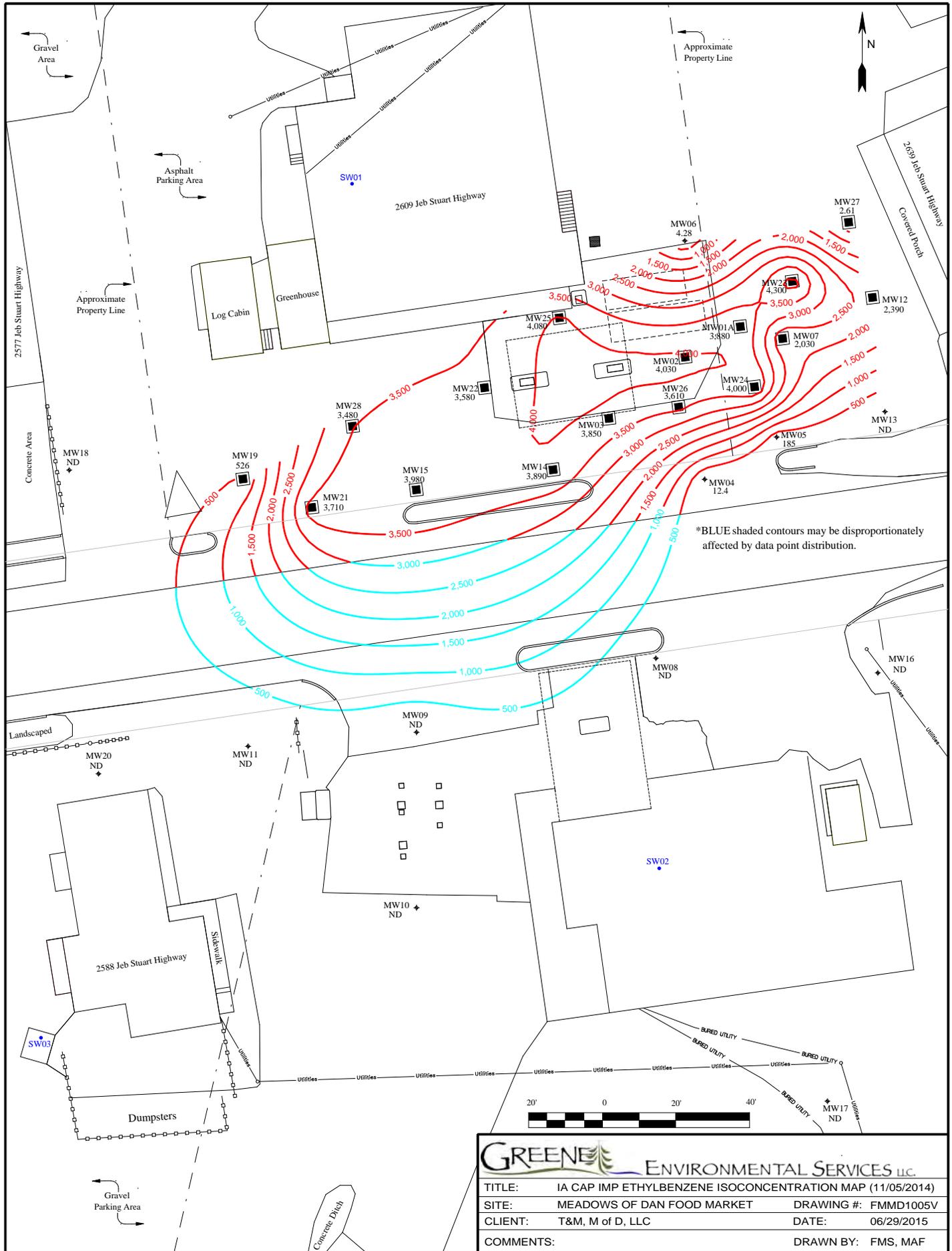


GREENE ENVIRONMENTAL SERVICES LLC.	
TITLE:	IA CAP IMP TPH-GRO ISOCONCENTRATION MAP (11/05/2014)
SITE:	MEADOWS OF DAN FOOD MARKET
CLIENT:	T&M, M of D, LLC
COMMENTS:	
DRAWING #:	FMMD1005S
DATE:	06/29/2015
DRAWN BY:	FMS, MAF

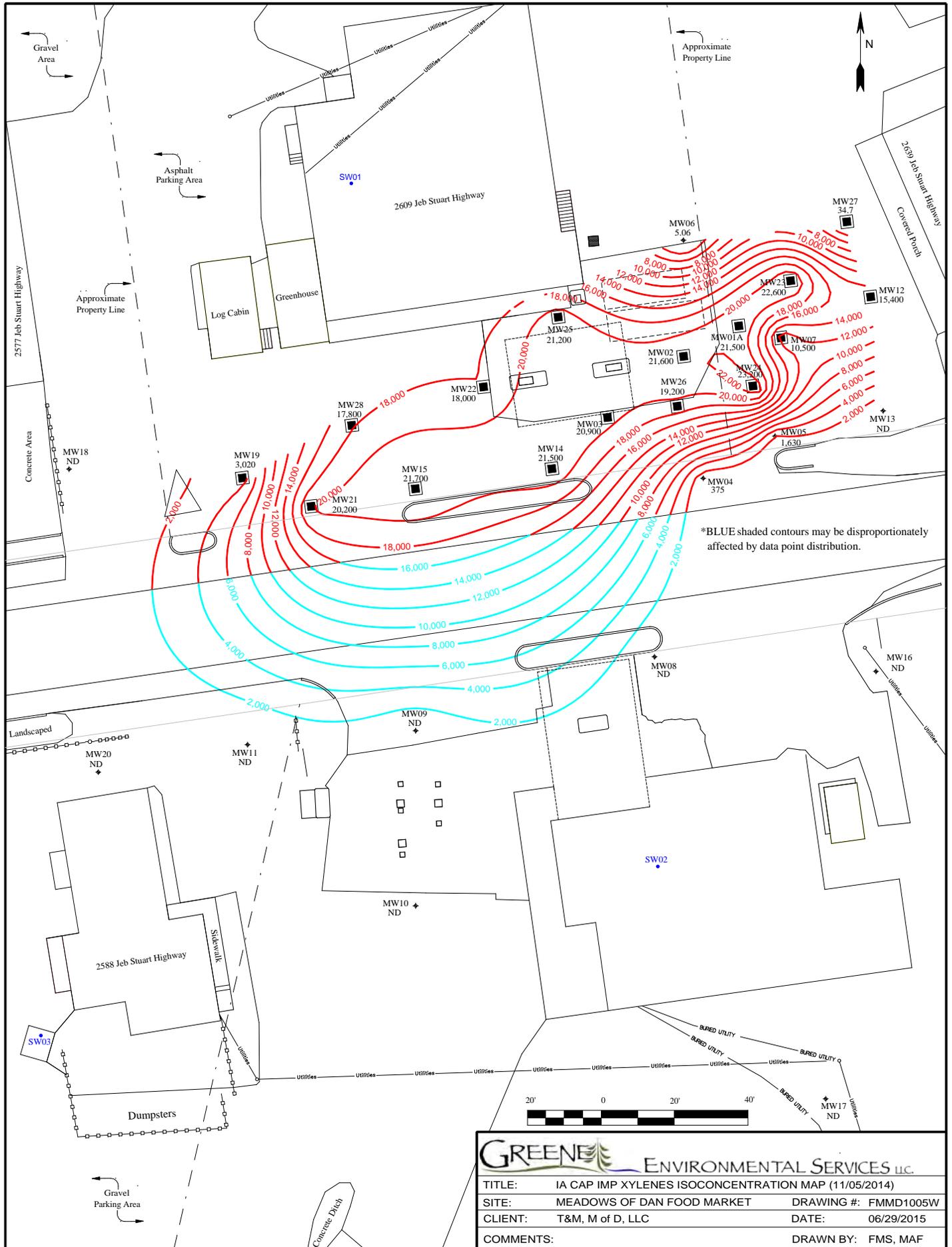


GREENE ENVIRONMENTAL SERVICES LLC.

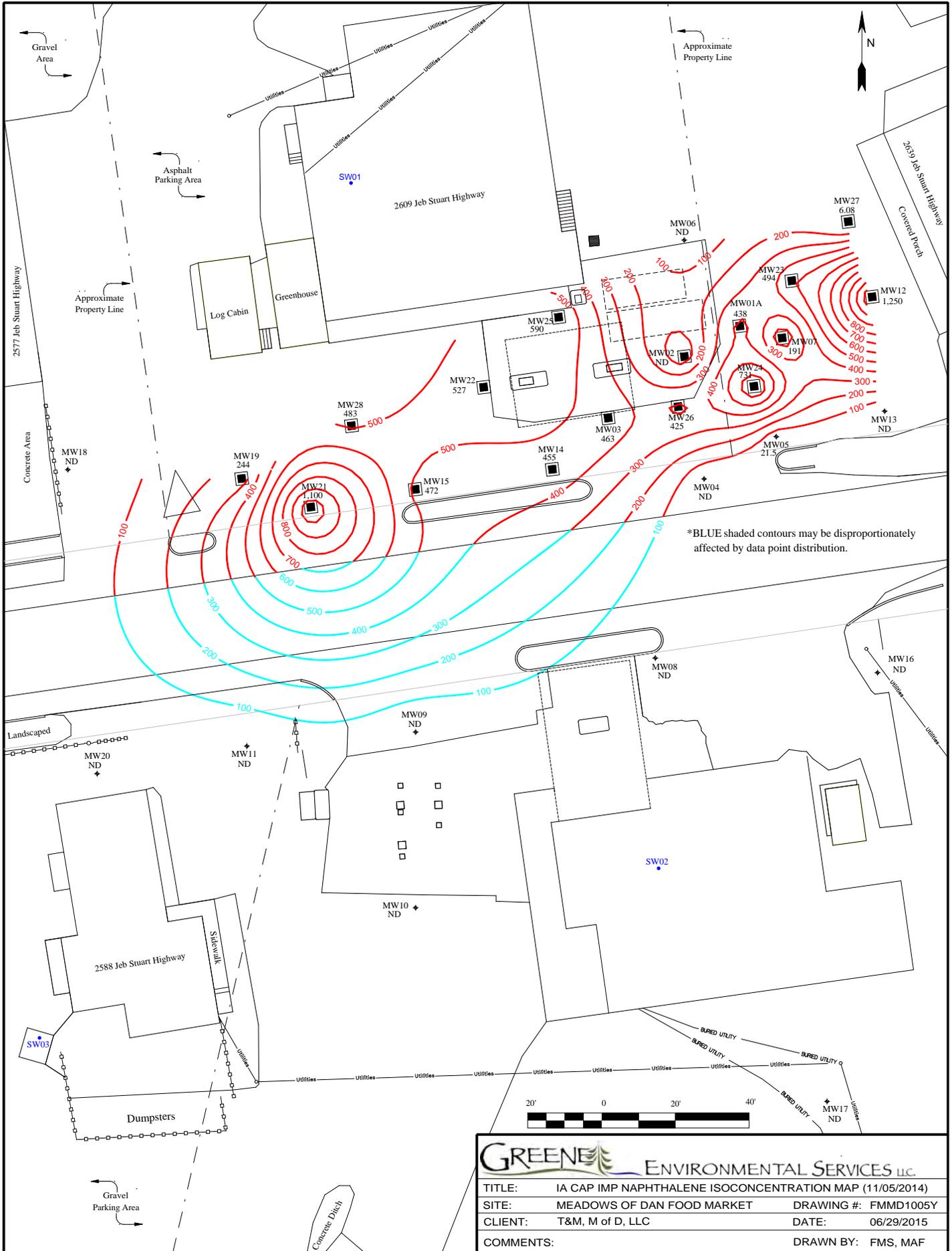
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SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005U
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:		DRAWN BY: FMS, MAF



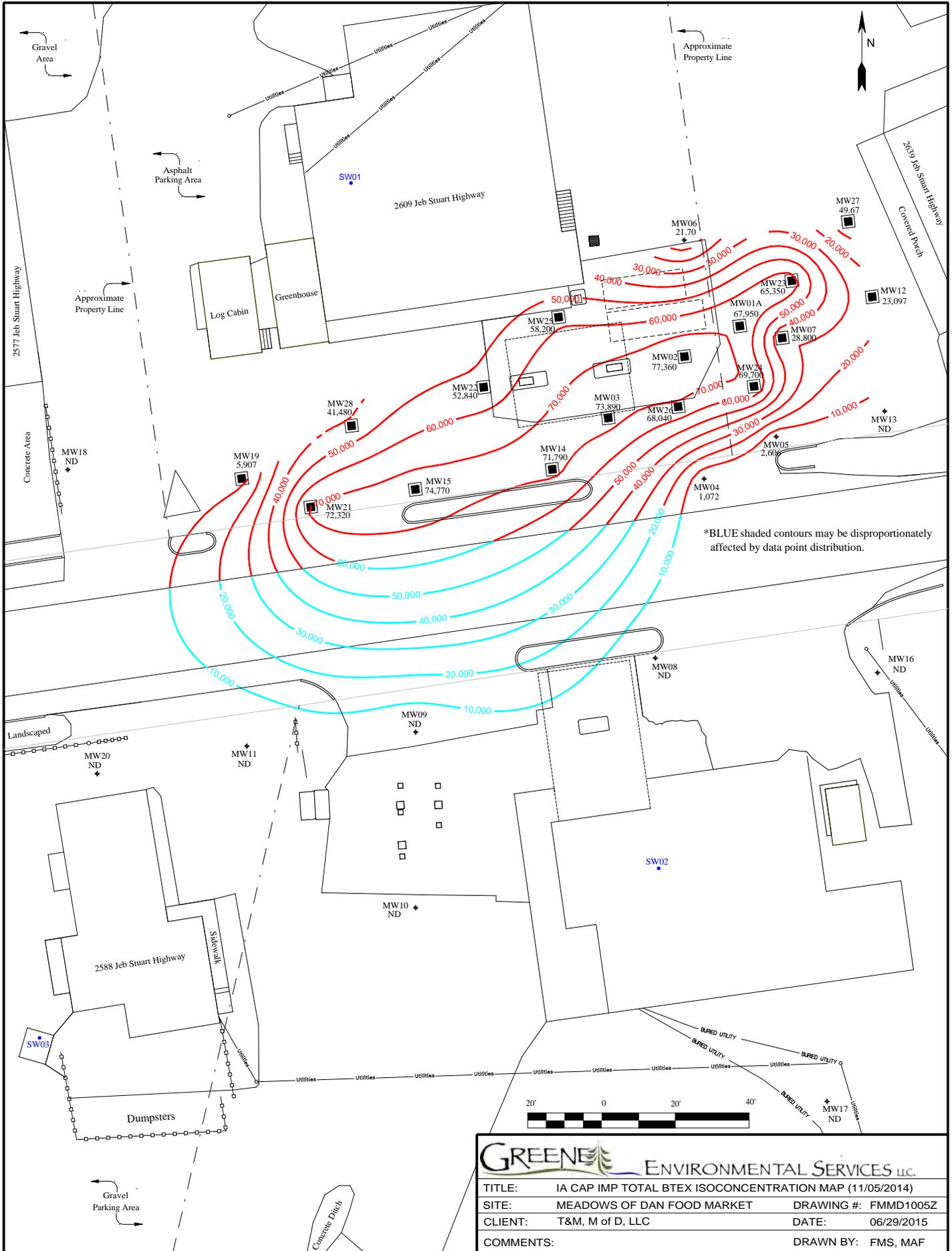
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TITLE:	IA CAP IMP ETHYLBENZENE ISOCONCENTRATION MAP (11/05/2014)
SITE:	MEADOWS OF DAN FOOD MARKET
CLIENT:	T&M, M of D, LLC
COMMENTS:	
DRAWING #:	FMMD1005V
DATE:	06/29/2015
DRAWN BY:	FMS, MAF



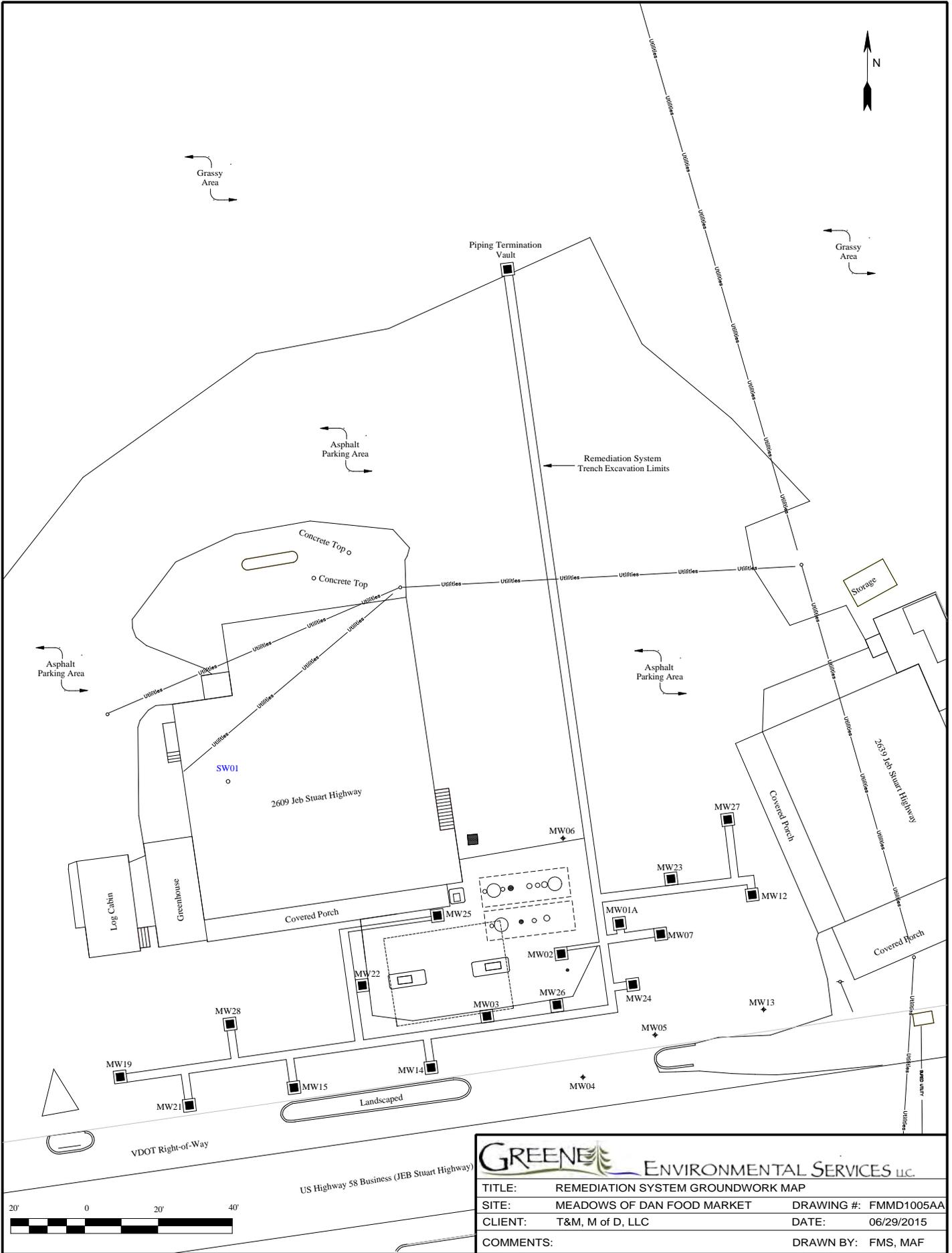
GREENE ENVIRONMENTAL SERVICES LLC.	
TITLE:	IA CAP IMP XYLENES ISOCONCENTRATION MAP (11/05/2014)
SITE:	MEADOWS OF DAN FOOD MARKET
CLIENT:	T&M, M of D, LLC
COMMENTS:	
DRAWING #:	FMMD1005W
DATE:	06/29/2015
DRAWN BY:	FMS, MAF



TITLE:	IA CAP IMP NAPHTHALENE ISOCONCENTRATION MAP (11/05/2014)	
SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005Y
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:		DRAWN BY: FMS, MAF



TITLE:	IA CAP IMP TOTAL BTEX ISOCONCENTRATION MAP (11/05/2014)	
SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005Z
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:	DRAWN BY: FMS, MAF	



TITLE:	REMEDIATION SYSTEM GROUNDWORK MAP	
SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005AA
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:		DRAWN BY: FMS, MAF

APPENDIX C

Geologic Information

Soil Boring Logs/Monitoring Well Construction Diagrams

Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B01

Diagram of Monitoring Well: MW01

Geologist: ADAM FLORA

Generation Date: 03/13/14

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration			Well Completion Details
							1000	2000	3000	
0		Ground Surface	0.0							
0.5		GRAVEL	0.5							
1		B01-1 (0'-4') Medium- to fine-grained micaceous silt with weathered material and a minor clay component; reddish-brown with black & light brown seams; slight petroleum odor		B01-1		ND	16.9			
2			4.0							
3										
4		B01-2 (4'-8') Fine- to medium-grained micaceous silt; ~6' bgs change to coarser-grained mica in a silty matrix; evidence of quartz ~8' bgs; reddish-brown to light brown color; slight petroleum odor		B01-2		ND	29.4			
5			8.0							
6										
7										
8		B01-3 (8'-12') Fine-grained micaceous silt with fine silt grains ~ 8'-10' bgs; ~11'-12'bgs is not as micaceous with increased weathering; reddish brown to light brown color; petroleum odor		B01-3		ND	41.8			
9			12.0							
10										
11										
12		B01-4 (12'-16') Medium-grained micaceous silty/fine sand with mica grains ~ 12'-14' bgs; ~14'-16' bgs not as micaceous with increased weathering; light brown color; slight petroleum odor		B01-4		ND	105.9			
13			16.0							
14										
15										
16		B01-5 (16'-20') NO RECOVERY		B01-5		NA	NA			
17			20.0							
18										
19										
20		B01-6 (20'-24') Fine-grained slight micaceous silty/ fine sand mix with fine-grained mica throughout; increased weathering; light brown color; strong petroleum odor		B01-6		17.8	660.0			
21			24.0							
22										
23										
24		B01-7 (24'-28') Fine-grained micaceous silty/fine sand mix with large mica grains ~ 27'-28' bgs; reddish brown to light brown color; very strong petroleum odor; moisture evident		B01-7		1,550	3852.0			
25			28.0							
26										
27										
28								2834.5		

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/24/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

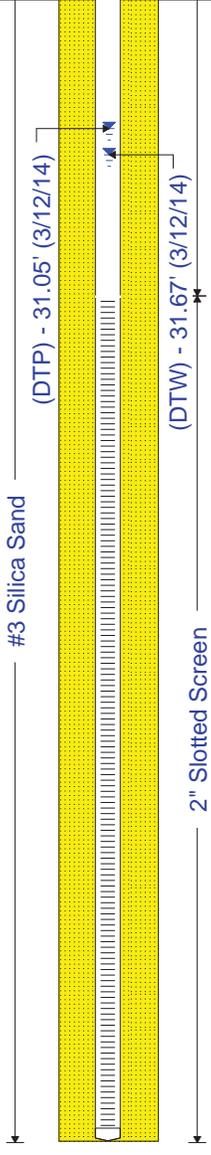
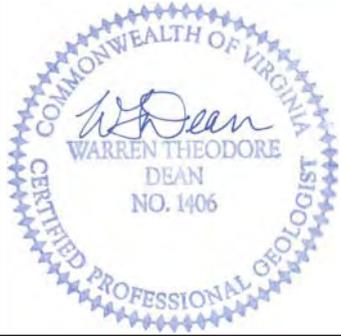
Log of Borehole: B01

Diagram of Monitoring Well: MW01

Geologist: ADAM FLORA

Generation Date: 03/13/14

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration			Well Completion Details	
							1000	2000	3000		
29		B01-8 (28'-32') Fine-grained micaceous silty/fine sand with large mica throughout; black/grayish color; very strong odor; mositure evident;									
30		Obtained rod refusal at ~ 32' bgs-switched to hollow-stem augers/continued drilling		B01-8		4,890		1817.0			
31			32.0								
32		B01-9 (32'-35') Fine-grained micaceous silty/fine sand with large mica throughout; black/grayish color; strong petroleum odor; mositure evident;									
33				B01-9		1,190		1174.0			
34			35.0								
35		B01-10 (35'-40') Fine-grained micaceous silty/fine sand with larger mica grains throughout; dark brown color; very strong odor; more mositure evident; groundwater likely									
36				B01-10		NA		1450.0			
37			40.0								
38											
39			45.0								
40		B01-11 (40'-45') Fine-grained micaceous silty/fine sand with larger mica grains throughout; dark brown color; very strong odor; groundwater likely									
41				B01-11		NA		1432.0			
42			45.0								
43											
44			45.0								
45		NO RECOVERY due to evidence of groundwater at ~ 47'-48' bgs.									
46		Converted B01 to MW01 at approximately 55.0' bgs.									
47											
48											
49											
50											
51											
52											
53											
54											
55			55.0								
56		End of Borehole									



Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/24/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B02

Diagram of Monitoring Well: MW02

Geologist: ADAM FLORA

Generation Date: 03/17/14

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration			Well Completion Details
							500	1000	1500	
0		Ground Surface	0.0							
0.5		CONCRETE	0.5							
1		B02-1 (0.5'-4') Fine-grained micaceous silty/fine sand with minor clay component and medium-grained mica flakes throughout; reddish brown to brown color; no petroleum odor	4.0	B02-1		ND	125.2			
2										
3										
4		B02-2 (4'-8') Fine-grained silty/fine sand with minor clay component and medium-grained mica flakes throughout; reddish brown to brown; very slight petroleum odor	8.0	B02-2		ND	141.3			
5										
6										
7										
8		B02-3 (8'-12') Fine-grained micaceous silty/fine sand with weathered material and medium-grained mica flakes at ~ 11'-12'; reddish brown to light brown petroleum odor	12.0	B02-3		ND	179.3			
9										
10										
11										
12		B02-4 (12'-16') Fine-grained micaceous silty/fine sand with large gravel-sized quartz grains at approximately 19'-20'; brown to light brown; strong petroleum odor	16.0	B02-4		22.9	212.4			
13										
14										
15										
16		B02-5 (16'-20') Fine-grained micaceous silty/fine sand to medium/large-grained quartz at approximately 19'-20'; slightly weathered; brown to light brown; strong petroleum odor	20.0	B02-5		799	586.3			
17										
18										
19										
20		B02-6 (20'-24') Fine-grained micaceous silty/fine sand to medium/large-grained quartz/mica flakes; slightly weathered; brown to light brown; strong petroleum odor	24.0	B02-6		ND	710.4			
21										
22										
23										
24		B02-7 (24'-28') Fine-grained micaceous silty/fine sand to large coarse-grained mica; organic material at approximately 27'-28'; brown to light brown/tan/blackish brown; strong petroleum odor	28.0	B02-7		479	877.7			
25										
26										
27										
28										

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER

Drilled by: DAVIDSON DRILLING

Drill Date: 02/24/2014

Hole Size: 6.875 INCHES



Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

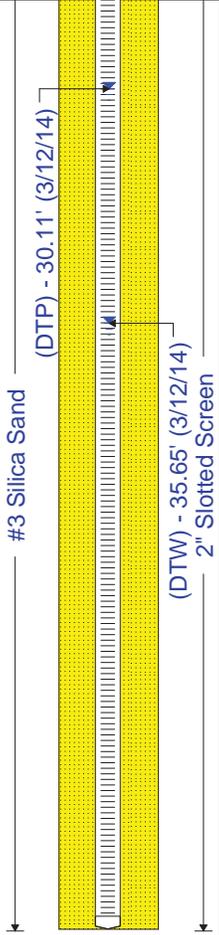
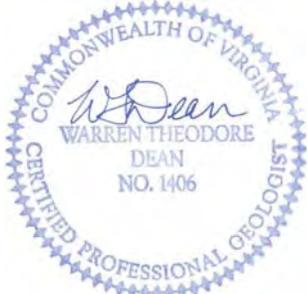
Log of Borehole: B02

Diagram of Monitoring Well: MW02

Geologist: ADAM FLORA

Generation Date: 03/17/14

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration			Well Completion Details	
							500	1000	1500		
29		B02-8 (28'-32') Fine-grained micaceous silty/fine sand to large coarse-grained mica; weathered material; brown to light brown; strong petroleum odor		B02-8		6,000			1292.3		
30									1707.0		
31			32.0								
32		B02-9 (32'-34') Fine-grained micaceous silty/fine sand to large coarse-grained mica with larger rock fragments at approximately 34' bgs; brown to light brown; strong petroleum odor		B02-9		1,830			1310.0		
33									1174.0		
34			34.0								
35		Rod refusal at 34' bgs switched to hollow-stem augers & continued drilling;	35.0	B02-10		NA					
36		B02-10 (34'-35') Fine-grained micaceous silty/fine sand to large coarse-grained mica with larger rock fragments at approximately 35' bgs; moisture evident		B02-11		NA			883.5		
37											
38		B02-11 (35'-40') Fine-grained micaceous silty/fine sand to medium-grained mica flakes throughout; dark brown to brown; very strong petroleum odor; moisture evident		B02-12		NA					
39			40.0								
40		B02-12 (40'-45') Fine-grained micaceous silty/fine sand to medium-grained mica flakes throughout; dark brown to brown; very strong petroleum odor; moisture evident									
41											
42			40.0						1434.0		
43											
44			45.0								
45		NO RECOVERY due to groundwater being present									
46		Converted B02 to MW02 at approximately 50' bgs.									
47											
48											
49											
50			50.0								
51		End of Borehole									
52											
53											
54											
55											
56											



Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/24/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B03

Diagram of Monitoring Well: MW03

Geologist: ADAM FLORA

Generation Date: 03/17/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH+GRO)	VOC Concentration			Well Completion Details
							1500	3000	4500	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B03-1 (0.5'-4') Fine-grained silty/fine sand with minor clay component; brown to reddish brown; no petroleum odor		B03-1		ND	3.3			
2			4.0							
4		B03-2 (4'-8') Fine-grained silty/fine sand with minor clay component; light brown to dark brown; no petroleum odor		B03-2		ND	6.4			
5			8.0							
8		B03-3 (8'-12') Fine-grained silty/fine sand with minor clay component; light brown to reddish brown; no petroleum odor		B03-3		ND	30.2			
9			12.0							
12		B03-4 (12'-16') Fine-grained silty/fine sand with minor clay component; light brown with reddish, gray seams; very slight petroleum odor		B03-4		ND	3.7			
13			16.0							
16		B03-5 (16'-20') Fine-grained silty/fine sand with minor clay component; reddish brown to light brown; weathered; very slight petroleum odor		B03-5		ND	9.3			
17			20.0							
20		B03-6 (20'-24') Fine-grained silty/fine sand with little to no clay component; reddish brown to light brown to grayish brown; petroleum odor		B03-6		ND	8.6			
21			24.0							
24		B03-7 (24'-28') Fine-grained silty/fine sand with little to no clay component; reddish brown to light brown to grayish brown; weathered; strong petroleum odor		B03-7		7.97	779.3	3274.1		
25			28.0							

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/25/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

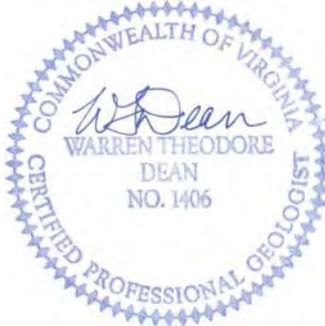
Log of Borehole: B03

Diagram of Monitoring Well: MW03

Geologist: ADAM FLORA

Generation Date: 03/17/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							1500	3000	4500		
29		B03-8 (28'-32') Fine-to medium-grained silty/fine sand with mica crystals; weathered; grayish brown; strong petroleum odor		B03-8		2,150	5769.0				
30											
31											
32		B03-9 (32'-33') Fine-to medium-grained silty/fine sand with mica crystals; weathered; grayish brown; strong petroleum odor	32.0	B03-9		3,790	87.1				
33			33.0								
34				B03-10		705		3540.0			
35		Rod refusal at ~ 33' bgs; switched to hollow-stem augers.	35.0								
36		B03-10 (33'-35') Fine-to medium-grained silty/fine sand with mica crystals; weathered; grayish brown; strong petroleum odor; moisture present									
37											
38		B03-11 (35'-40') Fine-to medium-grained silty/fine sand with mica crystals; weathered; grayish brown; strong petroleum odor; moisture present		B03-11		NA		1451.0			
39											
40		B03-12 (40'-45') Fine-to medium-grained silty/fine sand with mica crystals; weathered; grayish brown; strong petroleum odor	40.0	B03-12		NA		1752.0			
41											
42											
43											
44											
45	No additional samples collected due to groundwater.										
46	Converted B03 to MW03 at approximately 50' bgs.										
47											
48											
49											
50	End of Borehole										
51											
52											
53											
54											
55											
56											



Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/25/2014
 Hole Size: 6.875 INCHES

GREENE
 ENVIRONMENTAL SERVICES LLC.
 200 Buckwheat Lane
 Rocky Mount, VA 24151

Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B04

Diagram of Monitoring Well: MW04

Geologist: ADAM FLORA

Generation Date: 03/17/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							12.5	25	37.5		
0		Ground Surface	0.0								
0.5		ASPHALT	0.5								
1		B04-1 (0.5'-4') Fine-grained micaceous silty/fine sand with minor clay component; reddish brown; no petroleum odor		B04-1	NA		10.0				
2			4.0								
3											
4		B04-2 (4'-8') Fine-grained micaceous silty/fine sand with large micaceous structure with little to no clay component; reddish brown with black seams; no petroleum odor		B04-2	NA		6.7				
5			8.0								
6											
7											
8		B04-3 (8'-12') Fine-grained micaceous silty/fine sand with large quartz gravel-grains at approximately 9' bgs with large mica grains throughout; light brown to reddish brown; no petroleum odor		B04-3	NA		11.5				
9			12.0								
10											
11											
12		B04-4 (12'-16') Fine-grained micaceous silty/fine sand to large-grained micaceous silty/fine sand; weathered; reddish brown to light brown; no petroleum odor		B04-4	NA		2.0				
13			16.0								
14											
15											
16		B04-5 (16'-20') Fine-grained micaceous silty/fine sand with large mica flakes throughout; weathered; reddish brown to light brown; very slight petroleum odor		B04-5	NA		5.0				
17			20.0								
18											
19											
20		B04-6 (20'-24') Fine-grained micaceous silty/fine sand with large mica flakes throughout; weathered; light brown with mottled seams; very slight petroleum odor		B04-6	NA		6.2				
21			24.0								
22											
23											
24							5.1				

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/25/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

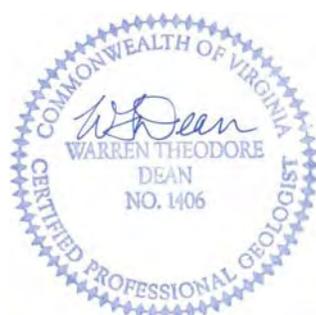
Log of Borehole: B04

Diagram of Monitoring Well: MW04

Geologist: ADAM FLORA

Generation Date: 03/17/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							12.5	25	37.5	
25		B04-7 (24'-28') Fine-grained micaceous silty/fine sand with large mica grains throughout; weathered; light brown to grayish brown; no petroleum odor					5.1			
26			28.0	B04-7	ND		4.0			
27										
28		B04-8 (28'-32') Fine-grained micaceous silty/fine sand with large mica grains at approximately 32' bgs; weathered; large micaceous relic structure at ~ 32' bgs; light brown to grayish brown; no petroleum odor								
29										
30			32.0	B04-8	ND		6.8			
31										
32		B04-9 (32'-36') Fine-grained saprolite structure with large mica grains; less weathered; light brown to grayish brown; no petroleum odor; moisture evident								
33										
34			36.0	B04-9	ND		4.9			
35										
36		B04-10 (36'-39') Fine-grained saprolite structure with large mica grains; mottled grayish brown; slight petroleum odor; groundwater evident								
37										
38		Rod refusal at approximately 39' bgs; switched to hollow-stem augers and continued drilling.								
39			39.0	B04-10	NA		5.9			
40		No additional samples taken due to the presence of groundwater.								
41		Converted B04 to MW04 at approximately 45' bgs.								
42										
43										
44										
45			45.0							
46		End of Borehole								
47										
48										



Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/25/2014
 Hole Size: 6.875 INCHES

GREENE
 ENVIRONMENTAL SERVICES LLC.
 200 Buckwheat Lane
 Rocky Mount, VA 24151

Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B05

Diagram of Monitoring Well: MW05

Geologist: ADAM FLORA

Generation Date: 03/17/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							12.5	25	37.5	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B05-1 (0.5'-4') Fine-grained micaceous silty/fine sand with minor clay component and medium to large mica grains throughout; weathered; reddish brown; no petroleum odor		B05-1	NA		2.7			
2			4.0							
3										
4		B05-2 (4'-8') Fine-grained micaceous silty/fine sand with large quartz fragments at approximately 8' bgs; weathered; reddish brown to light brown; no petroleum odor		B05-2	NA		1.9			
5			8.0							
6										
7										
8		B05-3 (8'-12') Fine-grained micaceous silty/fine sand with minor clay component and medium to large mica flakes except at approximately 12' bgs; weathered; brown to orangish brown; no petroleum odor		B05-3	NA		3.7			
9			12.0							
10										
11										
12		B05-4 (12'-16') Fine-grained micaceous silty/fine sand with minor clay component and medium to large mica grains throughout; less weathered; brown to orangish brown; no petroleum odor		B05-4	NA		2.4			
13			16.0							
14										
15										
16		B05-5 (16'-20') Fine-grained micaceous silty/fine sand with medium mica grains throughout; sandy mix at approximately 20' bgs; less weathered; orangish brown to grayish brown; no petroleum odor		B05-5	NA		4.0			
17			20.0							
18		Rod refusal at approximately 20' bgs; switched to hollow-stem augers and continued drilling.								
19										
20		B05-6 (20'-25') Fine-grained micaceous silty/fine sand with minor clay component and small mica flakes; dark brown; no petroleum odor; moisture evident		B05-6	ND		5.0			
21			25.0							
22										
23										
24										
25							4.9			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER

Drilled by: DAVIDSON DRILLING

Drill Date: 02/26/14

Hole Size: 6.875 INCHES



Project No: FMMD1002

Project: SITE CHARACTERIZATION REPORT

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

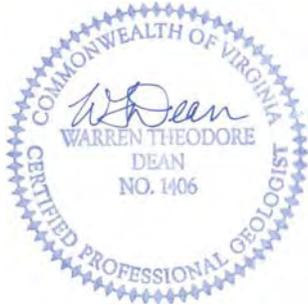
Log of Borehole: B05

Diagram of Monitoring Well: MW05

Geologist: ADAM FLORA

Generation Date: 03/17/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							12.5	25	37.5		
26		B05-7 (25'-30') Fine-grained micaceous silty/fine sand with small mica flakes; dark brown; no petroleum odor; moisture evident					4.9			<p>#3 Silica Sand</p> <p>(DTW) - 31.31' (3/12/14)</p> <p>2" Slotted Screen</p>	
27				B05-7		ND	4.8				
28											
29											
30			30.0								
31		B05-8 (30'-35') Fine-grained micaceous silty/fine sand with small mica flakes; dark brown; no petroleum odor; moisture evident									
32				B05-8		ND	17.5				
33											
34											
35			35.0								
36		B05-9 (35'-40') Fine-grained micaceous silty/fine sand with small mica flakes; dark brown; no petroleum odor; moisture evident									
37				B05-9		NA	29.0				
38											
39											
40			40.0								
41		No additional samples taken due to the presence of groundwater.									
42		Converted B05 to MW05 at approximately 45' bgs.									
43											
44											
45			45.0								
46		End of Borehole									
47											
48											
49											
50											



Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/26/14
 Hole Size: 6.875 INCHES

GREENE
 ENVIRONMENTAL SERVICES LLC
 200 Buckwheat Lane
 Rocky Mount, VA 24151

Project No: FMMD1002

Log of Borehole: B06

Project: SITE CHARACTERIZATION REPORT

Diagram of Monitoring Well: MW06

Client: T & M, M OF D, L.L.C.

Geologist: ADAM FLORA

Location: MEADOWS OF DAN FOOD MARKET

Generation Date: 03/17/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration			Well Completion Details
							12.5	25	37.5	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B06-1 (0.5'-4') Fine-grained micaceous silty/fine sand with minor clay component; small to medium mica grains throughout; weathered; dark brown to orangish brown; no petroleum odor		B06-1		NA	1.1			
2			4.0							
4		B06-2 (4'-8') Fine-grained micaceous silty/fine sand with minor clay component; small to medium mica grains throughout; weathered; orangish brown to brown; very slight petroleum odor		B06-2		NA	2.0			
5			8.0							
8		B06-3 (8'-12') Fine-grained micaceous silty/fine sand with minor clay component; small to medium mica grains throughout; weathered; brown to orangish brown; very slight petroleum odor		B06-3		NA	4.3			
9			12.0							
12		B06-4 (12'-16') Fine-grained micaceous silty/fine sand with minor clay component and small to medium mica and quartz grains; weathered; brown to orangish brown; slight petroleum odor		B06-4		NA	2.5			
13			16.0							
16		B06-5 (16'-20') Fine-grained saprolyte with medium to large mica grains; orangish brown to grayish brown; slight petroleum odor		B06-5		NA	2.6			
17			20.0							
20		B06-6 (20'-24') Fine-grained saprolyte with large quartz gravel; orangish brown to brown; slight petroleum odor		B06-6		NA	2.5			
21			24.0							
24							1.7			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/26/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1002

Log of Borehole: B06

Project: SITE CHARACTERIZATION REPORT

Diagram of Monitoring Well: MW06

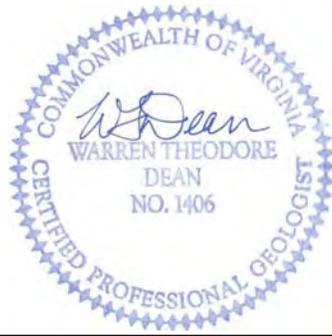
Client: T & M, M OF D, L.L.C.

Geologist: ADAM FLORA

Location: MEADOWS OF DAN FOOD MARKET

Generation Date: 03/17/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							12.5	25	37.5	
25		B06-7 (24'-26') Fine-grained saprolite with large quartz gravel; orangish brown to brown; slight petroleum odor		B06-7		ND	1.7			
26		Rod refusal at approximately 26' bgs; switched to hollow-stem augers and continued drilling.	26.0				1.3			
27		B06-8 (26'-30') Fine-grained silty/fine sand with minor clay component; dark brown; no petroleum odor		B06-8		ND	0.8			
28										
29										
30			30.0							
31		B06-9 (30'-35') Fine-grained silty/fine sand with minor clay component; dark brown; no petroleum odor		B06-9		ND	0.7			
32										
33										
34										
35		B06-10 (35'-40') Fine-grained silty/fine sand with minor clay component; dark brown; no petroleum odor		B06-10		NA	1.2			
36										
37		Converted B06 to MW06 at approximately 45' bgs.								
38										
39										
40			40.0							
41		No additional samples taken due to the presence of groundwater.								
42		Converted B06 to MW06 at approximately 45' bgs.								
43										
44										
45		End of Borehole	45.0							
46										
47										
48										



Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING
 Drill Date: 02/26/2014
 Hole Size: 6.875 INCHES

GREENE
 ENVIRONMENTAL SERVICES LLC.
 200 Buckwheat Lane
 Rocky Mount, VA 24151

Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B07

Diagram of Monitoring Well: MW07

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							75	150	225	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B07-1 (0.5'-4') Fine- to medium-grained; light brown to reddish brown; micaceous silty fine sand with mica flakes throughout; very slight petroleum odor; weathered		B07-1		ND/ND	0.7			
2										
3										
4		B07-2 (4'-8') Fine- to medium-grained; light, orangish brown; micaceous silty fine sand with mica flakes throughout; very slight petroleum odor; large-grained quartz at approximately 7' bgs; weathered	4.0	B07-2		ND/ND	1.1			
5										
6										
7										
8		B07-3 (8'-12') Fine- to medium-grained; brown; micaceous silty fine sand with mica structure at approximately 10' bgs; drastic change to a silty clay with mica flakes throughout at approximately 11' bgs; very slight petroleum odor	8.0	B07-3		ND/ND	1.5			
9										
10										
11										
12		B07-4 (12'-16') Fine- to medium-grained; light, orangish brown to whitish, mottled color; micaceous silty fine sand with quartz rock fragments at approximately 15' bgs; no petroleum odor; weathered	12.0	B07-4		ND/ND	2.7			
13										
14										
15										
16		B07-5 (16'-20') Fine- to medium-grained; light brown to reddish brown; micaceous silty fine sand with mica structure throughout; large-grained quartz rock fragments at approximately 18' bgs to bottom; no petroleum odor; weathered	16.0	B07-5		ND/ND	7.2			
17										
18										
19										
20		B07-6 (20'-24') Fine- to medium-grained; brown to tannish brown; micaceous silty fine sand with relic mica structure at approximately 23' bgs; mica flakes throughout; small-grained quartz rock fragments at approximately 23' bgs; very slight petroleum odor; weathered	20.0	B07-6		ND/0.105	10.5			
21										
22										
23										
24			24.0				70.7			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/28/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B07

Diagram of Monitoring Well: MW07

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							75	150	225		
25		B07-7 (24'-28') Fine- to medium-grained; brown to orangish brown; micaceous silty fine sand to fine silty sand; relic mica structure at approximately 25'-27' bgs; drastic change in relic structure at approximately 27' bgs; moisture present; petroleum odor		B07-7		30.7/0.220	70.7	130.9		<p>#3 Silica Sand</p> <p>(DTW) - 31.83' - (06/18/14)</p> <p>2" Slotted Screen</p>	
26			28.0								
27											
28		B07-8 (28'-31') Fine- to medium-grained; light brown to grayish brown; micaceous silty fine sand with heavy mica relic structure throughout; moisture evident; strong petroleum odor; small-grained quartz fragments at approximately 31' bgs;		B07-8		ND/6.14		259.7			
29			31.0								
30		Rod refusal at approximately 31'bgs, switched to hollow-stem augers.									
31		B07-9 (31'-35') Fine- to medium-grained; light brown to grayish brown; micaceous silty fine sand with heavy mica relic structure throughout; moisture evident; strong petroleum odor;		B07-9		ND/0.252	29.5				
32			35.0								
33											
34		B07-10 (35'-40') Fine- to medium-grained; light brown to grayish brown; micaceous silty fine sand with heavy mica relic structure throughout; moisture evident; strong petroleum odor;		B07-10		NA/NA	28.7				
35			40.0								
36											
37											
38											
39											
40		No additional samples taken. Converted B07 to MW07 at approximately 45' bgs.									
41			45.0								
42											
43											
44											
45		End of Borehole									
46											
47											
48											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/28/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B08

Diagram of Monitoring Well: MW08

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B08-1 (0.5'-4') Medium-grained; reddish-orange brown; silty clay mix with minor mica flakes; weathered; no petroleum odor; minor rock fragments at approximately 4' bgs		B08-1		NA/NA	0.0			
2			4.0							
4		B08-2 (4'-8') Fine-to medium-grained; reddish brown to orangish brown; silty clay mix with minor quartz fragments and sand at approximately 7' bgs; extremely weathered; no petroleum odor		B08-2		NA/NA	0.0			
5			8.0							
6										
8		B08-3 (8'-12') Fine-grained; orangish brown with mottled seams; fine-grained silty clay mix; less weathered; no petroleum odor		B08-3		NA/NA	0.0			
9			12.0							
10										
12		B08-4 (12'-16') Fine-grained; orangish brown with mottled seams; fine-grained silty clay mix; less weathered; no petroleum odor; medium-to large-grained quartz fragments at approximately 14-16' bgs; moisture present		B08-4		NA/NA	0.0			
13			16.0							
14										
15										
16		B08-5 (16'-20') Fine-grained; orangish brown with mottled seams; fine-grained silty clay mix; less weathered; no petroleum odor; medium- to large-grained quartz at approximately 19-20' bgs; moisture present		B08-5		NA/NA	0.0			
17			20.0							
18										
19										
20		B08-6 (20'-24') Fine-grained; orangish brown with mottled seams; fine-grained silty clay mix; less weathered; no petroleum odor; sandy silty mix at approximately 23' bgs; moisture present		B08-6		NA/NA	0.0			
21			24.0							
22										
23										
24		B08-7 (24'-26') Fine-grained; orangish brown with mottled seams; fine-grained silty clay mix; less weathered; no petroleum odor; extremely weathered; medium-to large-grained rock fragments at approximately 24-26' bgs		B08-7		ND/ND	0.0			
25			26.0							
26										
27										
28		Rod Refusal at approximately 26' bgs.								

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER

Drilled by: DAVIDSON DRILLING, INC.

Drill Date: 04/28/2014

Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B08

Diagram of Monitoring Well: MW08

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							50	100	150		
29		No additional samples taken. Converted B08 to MW08 at approximately 45' bgs.									
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45			45.0								
46		End of Borehole									
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/28/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B09

Diagram of Monitoring Well: MW09

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B09-1 (0.5'-4') Fine- to medium-grained; reddish brown to orangish brown; clay to silty clay mix and large-grained quartz structure at approximately 3.5' bgs; no petroleum odor	4.0	B09-1		NA/NA	0.0			
2										
3										
4		B09-2 (4'-8') Fine- to medium-grained; reddish brown to light orangish brown; micaceous silty clay to weathered medium-grained silty fine sand; heavy mica structure at approximately 7' bgs; no petroleum odor	8.0	B09-2		NA/NA	0.0			
5										
6										
7										
8		B09-3 (8'-12') Fine- to medium-grained; orangish brown with mottled seams; micaceous silty fine sand; weathered; no petroleum odor	12.0	B09-3		NA/NA	0.0			
9										
10										
11										
12		B09-4 (12'-16') Fine- to medium-grained silty fine sand with mica flakes throughout though not as prevalent at approximately 15' bgs; no petroleum odor	16.0	B09-4		NA/NA	0.0			
13										
14										
15										
16		B09-5 (16'-20') Fine- to medium-grained; reddish brown to tannish brown; micaceous silty fine sand with mica flakes throughout; heavy relic mica structure at approximately 19' bgs; no petroleum odor	20.0	B09-5		NA/NA	0.0			
17										
18										
19										
20		B09-6 (20'-24') Fine- to medium-grained; reddish brown to tannish brown; micaceous silty fine sand with mica flakes throughout; heavy relic mica structure at approximately 23' bgs; extremely weathered; no petroleum odor; moisture present	24.0	B09-6		NA/NA	0.0			
21										
22										
23										
24		B09-7 (24'-28') Fine- to medium-grained; light brown to tannish brown; micaceous silty fine sand with mica flakes throughout; no petroleum odor; moisture present	28.0	B09-7		ND/ND	0.0			
25										
26										
27										
28										

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/28/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B09

Diagram of Monitoring Well: MW09

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
29		B09-8 (28'-32') Fine- to medium-grained; light brown to tannish brown; micaceous silty fine sand with mica flakes throughout; heavily weathered with mica relic structure at approximately 31.5' bgs; no petroleum odor		B09-8		ND/ND	0.0			<p>#3 Silica Sand</p> <p>(DTW) - 33.21' - (06/18/14)</p> <p>2" Slotted Screen</p>
30			32.0			NA/NA	0.0			
31				B09-9						
32		B09-9 (32'-33') Fine- to medium-grained; light brown to tannish brown; micaceous silty fine sand with mica flakes throughout; heavily weathered with mica relic structure	33.0							
33		Rod refusal at approximately 33' bgs. No additional samples taken. Converted B09 to MW09 at approximately 45' bgs.								
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45		End of Borehole	45.0							
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/28/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B10

Diagram of Monitoring Well: MW10

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		GRAVEL	0.5							
1		B10-1 (0.5'-4') Fine-grained; dark brown; silty clay mix with small rock fragments; very slight petroleum odor		B10-1		NA/NA	0.0			
2										
3										
4		B10-2 (4'-8') Fine-grained; dark brown to reddish brown; silty clay mix; weathered silty clay layer at approximately 7.5' bgs; no petroleum odor	4.0	B10-2		NA/NA	0.0			
5										
6										
7										
8		B10-3 (8'-12') Fine-grained; brown to reddish brown; clay to micaceous silty fine sand; no petroleum odor	8.0	B10-3		NA/NA	0.0			
9										
10										
11										
12		B10-4 (12'-16') Fine- to medium-grained; reddish brown to dark orangish brown; micaceous silty fine sand with minor clay content and weathered quartz fragments at approximately 15' bgs; no petroleum odor	12.0	B10-4		NA/NA	0.0			
13										
14										
15										
16		B10-5 (16'-20') Fine- to medium-grained; dark orangish brown; micaceous silty fine sand with minor clay content; no petroleum odor	16.0	B10-5		NA/NA	0.0			
17										
18										
19										
20		B10-6 (20'-24') Fine- to medium-grained; dark orangish brown with black seams; micaceous silty fine sand; weathered material at approximately 21' bgs; no petroleum odor	20.0	B10-6		ND/ND	0.0			
21										
22										
23										
24		B10-7 (24'-28') Fine- to medium-grained; dark orangish brown with black seams; micaceous silty fine sand; moisture present at approximately 25' bgs; no petroleum odor	24.0	B10-7		ND/ND	0.0			
25										
26										
27										
28			28.0				0.0			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER

Drilled by: DAVIDSON DRILLING, INC.

Drill Date: 04/28/2014

Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B10

Diagram of Monitoring Well: MW10

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							0.0	50	100	150	
29		B10-8 (28'-32') Fine- to medium-grained; dark orangish brown with black seams; micaceous silty fine sand;					0.0				
30		Rod refusal at approximately 32' bgs; switched to hollow-stem augers and continued drilling.		B10-8		NA/NA	0.0				
31			32.0								
32		No additional samples taken. Converted B10 to MW10 at approximately 42' bgs.									
33											
34											
35											
36											
37											
38											
39											
40											
41											
42		End of Borehole	42.0								
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/28/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B11

Diagram of Monitoring Well: MW11

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		GRAVEL	0.5							
1		B11-1 (0.5'-4') Fine- to medium-grained; light brown to tannish brown; silty fine sand with mica flakes and moderate clay content throughout; no petroleum odor		B11-1		NA/NA	0.0			
2										
3										
4			4.0							
4		B11-2 (4'-8') Fine- to medium-grained; light brown to tannish brown; silty fine sand with mica flakes and moderate clay content throughout; no petroleum odor		B11-2		NA/NA	0.0			
5										
6										
7										
8			8.0							
8		B11-3 (8'-12') Fine- to medium-grained; reddish brown to orangish brown with mottled seams; silty fine sand with mica flakes throughout; weathered quartz fragments at approximately 11' bgs; no petroleum odor		B11-3		NA/NA	0.0			
9										
10										
11										
12			12.0							
12		B11-4 (12'-16') Fine- to medium-grained; reddish brown to orangish brown with black seams; silty fine sand with mica flakes throughout; heavier mica relic structure at approximately 15' bgs; no petroleum odor		B11-4		NA/NA	0.0			
13										
14										
15										
16			16.0							
16		B11-5 (16'-20') Fine- to medium-grained; reddish brown to orangish brown with black seams; silty fine sand with mica flakes throughout; heavier mica relic structure; no petroleum odor		B11-5		NA/NA	0.0			
17										
18										
19										
20			20.0							
20		B11-6 (20'-24') Fine- to medium-grained; tannish brown; silty fine sand with mica flakes; mica flakes stop at approximately 23' bgs; no petroleum odor		B11-6		ND/ND	0.3			
21										
22		Rod refusal at approximately 24' bgs; converted to hollow-stem augers and continued drilling.								
23										
24			24.0							

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/28/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B11

Diagram of Monitoring Well: MW11

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							50	100	150		
25		No additional samples taken. Converted B11 to MW11 at approximately 45' bgs.									
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45				45.0							
46			End of Borehole								
47											
48											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/28/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B12

Diagram of Monitoring Well: MW12

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							1000	2000	3000	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B12-1 (0.5'-4') Fine-to medium-grained; reddish brown to light orangish brown; micaceous silty fine sand with mica grains throughout; no petroleum odor; minor clay content at approximately 2' bgs		B12-1		NA/NA	0.0			
2										
3										
4		B12-2 (4'-8') Fine- to medium-grained; reddish brown; silty fine sand with heavy mica structure at approximately 7' bgs; weathered; no petroleum odor	4.0	B12-2		NA/NA	0.0			
5										
6										
7										
8		B12-3 (8'-12') Fine- to medium-grained; reddish brown; silty fine sand with heavy mica structure at approximately 7' bgs; weathered; no petroleum odor	8.0	B12-3		7.63/ND	0.2			
9										
10										
11										
12		B12-4 (12'-16') Medium-grained silty sand mix with heavy mica relic structure throughout; less weathered; slight petroleum odor	12.0	B12-4		11.6/ND	0.5			
13										
14										
15										
16		B12-5 (16'-20') Medium-grained; reddish brown to tannish brown with mottled seams; micaceous silty fine sand with minor clay content; heavy mica relic structure at approximately 19.5' bgs; no petroleum odor	16.0	B12-5		ND/ND	1.7			
17										
18										
19										
20		B12-6 (20'-23') Medium-grained; light orangish brown to reddish brown; micaceous silty fine sand with rock fragments at approximately 21' bgs; less mica relic structure; slight petroleum odor;	20.0	B12-6		ND/ND	17.2			
21										
22										
23		Rod refusal at approximately 23' bgs; switched to hollow-stem augers	23.0				489.2			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B12

Diagram of Monitoring Well: MW12

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							1000	2000	3000		
24		B12-7 (23'-35') Medium-grained; light orangish brown to reddish brown; micaceous silty fine sand with rock fragments; strong petroleum odor; evidence of groundwater at approximately 35' bgs.					489.2				
25											
26											
27											
28											
29					B12-7		75.1/1,110				
30									3793.0		
31											
32											
33											
34											
35		No additional samples taken. Converted B12 into MW12 at approximately 45' bgs.	35.0								
36											
37											
38											
39											
40											
41											
42											
43											
44											
45			45.0								
46		End of Borehole									

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B13

Diagram of Monitoring Well: MW13

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B13-1 (0.5'-4') Fine- to medium-grained; orangish brown to mottled brown; micaceous silty fine sand with rock fragments at approximately 3' bgs; no petroleum odor	4.0	B13-1		NA/NA	0.0			
2										
3										
4		B13-2 (4'-8') Fine- to medium-grained; mottled brown to reddish brown with white seams; micaceous silty fine sand to silty clay; no petroleum odor	8.0	B13-2		NA/NA	0.0			
5										
6										
7										
8		B13-3 (8'-12') Fine- to medium-grained; reddish brown to brown; silty clay to silty fine sand with mica flakes throughout; heavy mica relic structure at approximately 10.5' bgs; no petroleum odor	12.0	B13-3		NA/NA	0.0			
9										
10										
11										
12		B13-4 (12'-16') Medium-grained; brown to tannish brown; micaceous silty fine sand with mica structure throughout to silty fine sand; no petroleum odor	16.0	B13-4		NA/NA	0.0			
13										
14										
15										
16		B13-5 (16'-20') Medium-grained; tannish brown to grayish brown; silty fine sand to micaceous silty fine sand with medium- to large-grained quartz fragments at approximately 19' bgs; no petroleum odor; weathered	20.0	B13-5		NA/NA	0.0			
17										
18										
19										
20		B13-6 (20'-24') Medium-grained; tannish brown to grayish brown; silty fine sand with mica flakes throughout; weathered; no petroleum odor	24.0	B13-6		NA/NA	0.0			
21										
22										
23										
24		B13-7 (24'-28') Medium-grained; tannish brown to grayish brown; silty fine sand with mica flakes throughout; weathered; large rock fragments at approximately 27' bgs; no petroleum odor	28.0	B13-7		ND/ND	0.0			
25										
26										
27										
28										

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B13

Diagram of Monitoring Well: MW13

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							50	100	150		
29		B13-8 (28'-31') Medium-grained; tannish brown to grayish brown with mottled seams; silty fine sand and relic mica structure at approximately 30' bgs; no petroleum odor		B13-8		ND/ND	0.0			<p>#3 Silica Sand</p> <p>(DTW) - 31.44' - (06/18/14)</p> <p>2" Slotted Screen</p>	
30			31.0				0.0				
31		Rod refusal at approximately 31' bgs; switched to hollow-stem augers and continued drilling.									
32		No additional samples taken. Converted B13 into MW13 at approximately 45' bgs.									
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45		End of Borehole	45.0								
46											
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B14

Diagram of Monitoring Well: MW14

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B14-1 (0.5'-4') Fine- to medium-grained; grayish brown to reddish brown; micaceous silty fine sand with a minor clay component; no petroleum odor	4.0	B14-1		NA/NA	0.0			
2										
3										
4		B14-2 (4'-8') Fine- to medium-grained; dark brown to reddish brown; micaceous silty fine sand with mica relic structure throughout; weathered; no petroleum odor	8.0	B14-2		ND/ND	0.6			
5										
6										
7										
8		B14-3 (8'-12') Fine- to medium-grained; tannish brown to reddish brown; micaceous silty fine sand with heavy mica relic structure throughout to silty sand with clay and mica throughout; weathered; slight petroleum odor	12.0	B14-3		ND/ND	8.3			
9										
10										
11										
12		B14-4 (12'-16') Medium-grained; reddish brown to tannish orangish brown; silty fine sand with mica throughout; at approximately 15' bgs less mica and weathering observed; slight petroleum odor	16.0	B14-4		ND/ND	0.5			
13										
14										
15										
16		B14-5 (16'-20') Medium-grained; tannish brown with mottled seams; micaceous silty fine sand with mica structure throughout; weathered; slight petroleum odor	20.0	B14-5		ND/ND	6.2			
17										
18										
19										
20		B14-6 (20'-24') Medium-grained; tannish brown with mottled seams; micaceous silty fine sand with mica structure throughout; weathered; slight petroleum odor	24.0	B14-6		ND/ND	2.3			
21										
22										
23										
24		B14-7 (24'-28') Medium-grained; tannish brown with mottled seams; micaceous silty fine sand with mica structure throughout; weathered; heavy mica relic structure at approximately 27' bgs and medium-grained quartz; slight petroleum odor	28.0	B14-7		ND/ND	17.2			
25										
26										
27										
28							18.2			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES

GREENE
 ENVIRONMENTAL SERVICES LLC
 200 Buckwheat Lane
 Rocky Mount, VA 24151

Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B14

Diagram of Monitoring Well: MW14

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE		PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
29		B14-8 (28'-31.5') Medium-grained; tannish to orangish brown; micaceous silty fine sand with heavy mica relic structure to silty fine sand with minimal mica flakes; petroleum odor		B14-8		5.33/ND	18.2			<p>#3 Silica Sand (DTP) - 32.09' - (06/18/14)</p> <p>2" Slotted Screen (DTW) - 35.05' - (06/18/14)</p>
30							18.9			
31		Rod refusal at approximately 31.5' bgs; converted to hollow-stem augers and continued drilling.	31.5							
32		No additional samples taken. Converted B14 into MW14 at approximately 45' bgs.								
45		End of Borehole	45.0							
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B15

Diagram of Monitoring Well: MW15

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							500	1000	1500	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B15-1 (0.5'-6') Medium-grained; reddish brown; micaceous silty fine sand; no petroleum odor								
2								1.3		
3				B15-1		40.8/ND				
4										
5										
6			6.0							
7		B15-2 (6'-12') Medium-grained; tannish/grayish brown; micaceous silty fine sand with heavy mica relic structure throughout; weathered; no petroleum odor								
8										
9				B15-2		6.45/ND			2.8	
10										
11										
12			12.0							
13		B15-3 (12'-16') Medium-grained; reddish brown to tannish/grayish brown; micaceous silty fine sand with heavy mica relic structure at approximately 15' bgs; weathered; no petroleum odor								
14										
15				B15-3		ND/ND			3.5	
16										
17		B15-4 (16'-20') Medium-grained; reddish brown to tannish/grayish brown; micaceous silty fine sand with heavy mica relic structure and large mica flakes at approximately 19' bgs; slight petroleum odor								
18										
19				B15-4		ND/ND			5.0	
20			20.0							
21		B15-5 (20'-24') Fine- to medium-grained; grayish brown; micaceous silty fine sand with mica flakes throughout; petroleum odor								
22										
23				B15-5		ND/ND			18.8	
24										
25										
26		B15-6 (24'-28') Fine- to medium-grained; grayish brown to tannish brown; micaceous silty fine sand with mica flakes throughout; petroleum odor								
27										
28			28.0	B15-6		ND/ND			39.9	
									940.4	

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B15

Diagram of Monitoring Well: MW15

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							500	1000	1500		
29	[Symbol: Fine to medium-grained sand]	B15-7 (28'-32') Fine- to medium-grained; tannish/grayish brown; micaceous silty fine sand with heavy mica structure throughout; fine- to medium-grained quartz fragments at approximately 30' bgs; strong petroleum odor; moisture evident		B15-7	[Symbol: Vertical lines]	48.3/415	[Red shaded area]			[Diagram: Well completion details showing #3 Silica Sand (DTP) - 33.02' - (06/18/14) and 2" Slotted Screen (DTW) - 35.65' - (06/18/14)]	
30		Rod refusal at approximately 32' bgs; converted to hollow-stem augers and continued drilling.	32.0				1841.0				
31		No additional samples taken. Converted B15 to MW15 at approximately 45' bgs.									
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45			45.0								
46		End of Borehole									
47											
48											
49											
50											
51											
52											
53											
54											
55											
56											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B16

Diagram of Monitoring Well: MW16

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		GRASS	0.5							
1		B16-1 (0.5'-5') Fine-grained; brown to reddish brown; clay; no petroleum odor		B16-1		NA/NA	0.0			
2										
3										
4										
5		B16-2 (5'-10') Fine-grained; brown; clay with minor mica grains throughout; no petroleum odor	5.0	B16-2		NA/NA	0.0			
6										
7										
8										
9										
10		B16-3 (15'-20') Fine- to medium-grained; brown to reddish brown; silty clay with mica throughout; no petroleum odor	10.0	B16-3		NA/NA	0.0			
11										
12										
13										
14										
15		B16-4 (16'-20') Fine- to medium-grained; brown to reddish brown; silty clay with mica throughout; no petroleum odor	15.0	B16-4		NA/NA	0.0			
16										
17										
18										
19										
20		B16-5 (20'-25') Fine-to medium-grained; brown to light brown; micaceous silty fine sand with mica flakes and a minor clay component; weathered; no petroleum odor	20.0	B16-5		NA/NA	0.0			
21										
22										
23										
24										
25			25.0				0.0			

Drill Method: HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B16

Diagram of Monitoring Well: MW16

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
26	[Symbol]	B16-6 (25'-30') Fine- to medium-grained; light brown; micaceous silty fine sand with mica relic structure throughout; less weathered; no petroleum odor		B16-6	[Symbol]	ND/ND	0.0			
27							0.0			
28										
29										
30	[Symbol]	B16-7 (30'-35') Fine- to medium-grained; light brown; micaceous silty fine sand with mica relic structure throughout; less weathered; no petroleum odor; groundwater present at approximately 32' bgs	30.0	B16-7	[Symbol]	ND/ND	0.0			
31							0.0			
32										
33		Rod refusal at approximately 35' bgs; converted to hollow-stem augers and continued drilling.								
34										
35			35.0							
36		No additional samples taken. Converted B16 to MW16 at approximately 45' bgs.								
37										
38										
39										
40										
41										
42										
43										
44										
45			45.0							
46		End of Borehole								
47										
48										
49										
50										

Drill Method: HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B17

Diagram of Monitoring Well: MW17

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		GRASS	0.5							
1		B17-1 (0.5'-5') Fine-grained; reddish brown; silty clay with mica grains throughout; weathered; no petroleum odor		B17-1		NA/NA	0.0			
2										
3										
4										
5			5.0							
6		B17-2 (5'-10') Fine-grained; reddish brown; silty clay with mica grains throughout; weathered; no petroleum odor		B17-2		NA/NA	0.0			
7										
8										
9										
10			10.0							
11		B17-3 (15'-20') Fine- to medium-grained; reddish brown to brown; micaceous silty clay with fine sand throughout; heavy mica relic structure at approximately 14' bgs; no petroleum odor		B17-3		NA/NA	0.0			
12										
13										
14										
15			15.0							
16		B17-4 (15'-20') Fine- to medium-grained; reddish brown to brown; micaceous silty clay with fine sand throughout; heavy mica relic structure at approximately 14' bgs; no petroleum odor		B17-4		ND/ND	0.0			
17										
18										
19										
20			20.0							
21		B17-5 (20'-25') Fine- to medium-grained; brown to dark brown; micaceous silty sand mix with minor clay content and mica grains throughout; no petroleum odor		B17-5		ND/ND	0.0			
22										
23										
24										
25			25.0				0.0			

Drill Method: HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B17

Diagram of Monitoring Well: MW17

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							50	100	150		
26		B17-6 (25'-30') Fine- to medium-grained; brown to dark brown; micaceous silty sand mix with minor clay content and mica grains throughout; groundwater present at approximately 26' bgs; rock fragments at approximately 29' bgs; no petroleum odor		B17-6		ND/ND	0.0				
27							0.0				
28											
29			30.0								
30		No additional samples taken. B17 converted into MW17 at approximately 40' bgs.									
31											
32											
33											
34											
35											
36											
37											
38											
39											
40			40.0								
41		End of Borehole									
42											
43											
44											
45											
46											
47											
48											
49											
50											

Drill Method: HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 04/29/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B18

Diagram of Monitoring Well: MW18

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B18-1 (0.5'-4') Fine- to medium-grained; brown with tan and dark brown; micaceous silty fine sand with a minor clay component; no petroleum odor		B18-1		NA/NA	0.0			
2										
3										
4		B18-2 (4'-8') Fine- to medium-grained; brown to orangish brown; silty fine sand with clay component; no petroleum odor	4.0	B18-2		NA/NA	0.0			
5										
6										
7										
8		B18-3 (8'-12') Fine- to medium-grained; brown with dark brown and tan seams; micaceous silty fine sand with larger quartz grains evident; no petroleum odor	8.0	B18-3		ND/ND	0.0			
9										
10										
11										
12		B18-4 (12'-16') Fine- to medium-grained; brown to gray to dark brown; micaceous silty fine sand; no petroleum odor	12.0	B18-4		ND/0.120	1.0			
13										
14										
15										
16		B18-5 (16'-20') Fine- to medium-grained; brown to tan; micaceous silty fine sand with larger mica grains evident; no petroleum odor	16.0	B18-5		ND/ND	0.3			
17										
18										
19										
20		B18-6 (20'-24') Fine- to medium-grained; brown to orangish brown; silty fine sand with clay component; no petroleum odor	20.0	B18-6		ND/ND	0.0			
21										
22										
23										
24			24.0							
25							0.6			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 05/02/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B18

Diagram of Monitoring Well: MW18

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							50	100	150		
26		B18-7 (24'-28') Fine- to medium-grained; brown to light brown; micaceous silty fine sand; weathered; saprolite; no petroleum odor		B18-7		ND/ND	0.6				
27			28.0				0.8				
28		B18-8 (28'-32') Fine- to medium-grained; brown to light brown; micaceous silty fine sand; weathered; saprolite; no petroleum odor		B18-8		ND/ND	0.0				
29			32.0								
30											
31											
32		B18-9 (32'-34') Fine- to medium-grained; brown to light orangish brown; micaceous silty fine sand with large quartz evident; weathered; slight moisture evident; no petroleum odor		B18-9		ND/ND	0.2				
33			34.0								
34		Rod refusal at approximately 34' bgs; converted to hollow-stem augers to install MW18. No additional samples taken. B18 converted to MW18.									
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45		End of Borehole	45.0								
46											
47											
48											
49											
50											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 05/02/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B19

Diagram of Monitoring Well: MW19

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B19-1 (0.5'-4') Fine- to medium-grained; brown with dark brown seams; slightly micaceous silty fine sand with clay component; no petroleum odor		B19-1		NA/NA	4.4			
2										
3										
4			4.0							
5		B19-2 (4'-8') Fine- to medium-grained; brown to light orangish brown; slightly weathered silty fine sand; no petroleum odor		B19-2		NA/NA	1.3			
6										
7										
8			8.0							
9		B19-3 (8'-12') Fine- to medium-grained; brown; very micaceous silty fine sand with larger mica flakes; slight petroleum odor		B19-3		ND/ND	7.2			
10										
11										
12			12.0							
13		B19-4 (12'-16') Fine- to medium-grained; mottled brown to dark brown to light brown; micaceous silty fine sand; saprolite; slight petroleum odor		B19-4		ND/ND	28.2			
14										
15										
16			16.0							
17		B19-5 (16'-20') Fine- to medium-grained; brown to light brown; micaceous silty fine sand with larger rock fragments evident; no petroleum odor		B19-5		ND/ND	6.3			
18										
19										
20			20.0							
21		B19-6 (20'-23') Fine- to medium-grained; brown with light brown; micaceous silty fine sand with weathered material and rock fragments		B19-6		ND/ND	19.5			
22		Rod refusal at approximately 23' bgs. Switched to hollow-stem augers and continued drilling.								
23			23.0				14.6			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 05/05/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1003

Project: SCRA

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B19

Diagram of Monitoring Well: MW19

Geologist: ADAM FLORA

Generation Date: 06/24/2014

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							50	100	150		
24		B19-7 (23'-30') Fine- to medium-grained; brown; micaceous silty fine sand; slight petroleum odor					14.6				
25				B19-7		ND/ND	3.2				
26											
27											
28											
29											
30			30.0								
31		No additional samples taken. B19 converted to MW19 at approximately 45' bgs									
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45			45.0								
46		End of Borehole									

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 05/05/2014
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B20

Diagram of Monitoring Well: MW20

Geologist: ADAM FLORA

Generation Date: 01/13/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							50	100	150	
0		Ground Surface	0.0							
0.5		GRAVEL	0.5							
1		B20-1 (0.5'-5') Fine- to medium-grained; reddish brown to brown; slightly micaceous silty fine sand with clay component; no petroleum odor		B20-1		NA / NA	0.0			
2										
3										
4										
5			5.0							
6		B20-2 (5'-10') Fine- to medium-grained; reddish brown to brown; silty clay to micaceous silty fine sand with weathered mica structure; no petroleum odor		B20-2		NA / NA	0.0			
7										
8										
9										
10			10.0							
11		B20-3 (10'-15') Fine- to medium-grained; reddish brown to tan; micaceous silty fine sand with mica flakes; no petroleum odor		B20-3		NA / NA	0.0			
12										
13										
14										
15			15.0							
16		B20-4 (15'-20') Fine- to medium-grained; mottled brown to tan to grayish brown; micaceous silty fine sand with weathered mica structure; saprolitic; no petroleum odor		B20-4		ND / ND	0.0			
17										
18										
19										
20			20.0							
21		B20-5 (20'-25') Fine- to medium-grained; mottled brown to tan to grayish brown; micaceous silty fine sand with weathered mica structure; saprolitic; no petroleum odor		B20-5		ND / ND	0.1			
22										
23										
24										
25			25.0				0.1			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B20

Diagram of Monitoring Well: MW20

Geologist: ADAM FLORA

Generation Date: 01/13/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							50	100	150		
26	[Symbol]	B20-6 (25'-30') Fine- to medium-grained; tan with black seams; weathered micaceous silty fine sand; saprolitic; no petroleum odor; evidence of potential moisture					0.1				
27				B20-6	ND / ND	0.0					
28											
29											
30			30.0								
31	[Symbol]	B20-7 (30'-35') Fine- to medium-grained; tan to grayish brown; micaceous silty fine sand with mica flakes throughout; evidence of groundwater; slight petroleum odor; larger rock fragments evident					1.9				
32				B20-7	ND / ND						
33											
34											
35			35.0								
36		No additional samples collected. Converted from direct push to hollow-stem auger drilling techniques. Soil boring B20 converted to MW20 approximately 45' bgs.									
37											
38											
39											
40											
41											
42											
43											
44											
45			45.0								
46		End of Borehole									
47											
48											
49											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B21

Diagram of Monitoring Well: MW21

Geologist: ADAM FLORA

Generation Date: 01/13/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							1250	2500	3750		
0		Ground Surface	0.0								
0.5	ASPHALT		0.5								
1		B21-1 (0.5'-5') Fine- to medium-grained; reddish brown to brown to tan; micaceous silty fine sand with clay component; no petroleum odor; larger mica flakes evident		B21-1		NA / NA	8.2				
5		B21-2 (5'-10') Fine- to medium-grained; brown to tan with black and dark brown seams; micaceous silty fine sand; larger rock fragments and mica flakes evident; slight petroleum odor	5.0	B21-2		NA / NA	0.5				
10		B21-3 (10'-15') Fine- to medium-grained; brown to orangish brown to tan with black seams; micaceous silty fine sand with small rock fragments evident; very slight petroleum odor	10.0	B21-3		NA / NA	0.0				
15		B21-4 (15'-20') Fine- to medium-grained; tan with black mottled seams; micaceous silty fine sand with small to large rock fragments evident; mica flakes evident; very slight petroleum odor	15.0	B21-4		ND / ND	0.5				
20		B21-5 (20'-25') Fine- to medium-grained; tan to grayish brown; micaceous silty fine sand with small to large rock fragments evident; mica flakes evident; slight petroleum odor	20.0	B21-5		ND / ND	38.9				
25			25.0				4.672				

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B21

Diagram of Monitoring Well: MW21

Geologist: ADAM FLORA

Generation Date: 01/13/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							1250	2500	3750		
26		B21-6 (25'-30') Fine- to medium-grained; tan to grayish brown; micaceous silty fine sand; saprolitic structure with quartz evident; petroleum odor					38.9			<p>#3 Silica Sand (DTP) - 33.39' - (11/05/14) (DTW) - 35.96' - (11/05/14) 2" Slotted Screen</p>	
27				B21-6		ND / ND	68.2				
28											
29											
30			30.0								
31		B21-7 (30'-35') Fine- to medium-grained; tan to grayish brown; micaceous silty fine sand with larger quartz fragments; strong petroleum odor evident; potential groundwater observed									
32				B21-7		38.4 / 1,420	4,672				
33											
34											
35			35.0								
36		No additional samples collected. Converted from direct push to hollow-stem auger drilling techniques. Soil boring B21 converted to MW21 approximately 45' bgs.									
37											
38											
39											
40											
41											
42											
43											
44											
45			45.0								
46		End of Borehole									
47											
48											
49											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

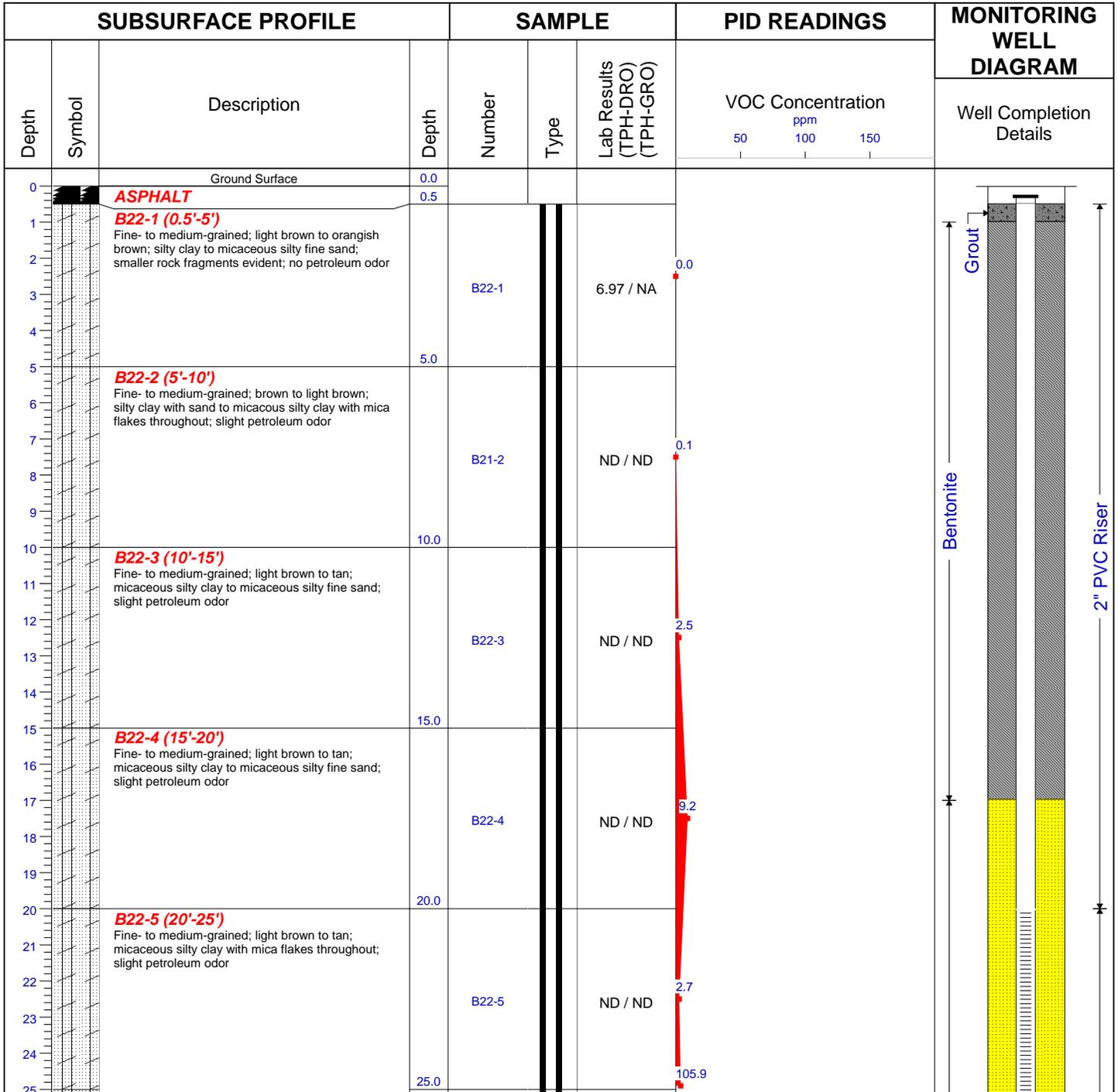
Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B22

Diagram of Monitoring Well: MW22

Geologist: ADAM FLORA

Generation Date: 01/13/15



Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B22

Diagram of Monitoring Well: MW22

Geologist: ADAM FLORA

Generation Date: 01/13/15

SUBSURFACE PROFILE				SAMPLE		PID READINGS	MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	Well Completion Details	
26		B22-6 (25'-26') Observed rod refusal approximately 26 feet bgs. Converted from direct push to hollow-stem auger drilling techniques. Fine- to medium-grained; light brown to tan; micaceous silty clay with mica flakes throughout; slight petroleum odor	26.0	B22-6		ND / ND		
27		B22-7 (26'-30') Fine- to medium-grained; light brown; micaceous silty fine sand with trace clay; strong petroleum odor		B22-7		ND / ND		
28								
29								
30		No additional samples collected. Soil boring B22 converted to MW22 approximately 45' bgs.	30.0					
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45		End of Borehole	45.0					
46								
47								
48								
49								

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B23

Diagram of Monitoring Well: MW23

Geologist: ADAM FLORA

Generation Date: 01/13/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							1000	2000	3000	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B23-1 (0.5'-5') Fine grained; reddish brown with black seams; micaceous silty sandy clay; no petroleum odor		B23-1		NA / NA	1.9			
5		B23-2 (5'-10') Fine to medium grained; reddish to dark brown; micaceous silty sand with minor clay component; contained larger quartz and mica fragments; slight petroleum odor		B23-2		NA / NA	3.6			
10		B23-3 (10'-15') Fine to medium grained; reddish to dark brown with black seams; micaceous silty sandy clay; contained small to large quartz fragments; slight petroleum odor		B23-3		NA / NA	14.7			
15		B23-4 (15'-20') Fine to medium grained; dark to reddish brown with black seams; micaceous silty sand; larger mica and quartz fragments throughout; slight petroleum odor		B23-4		ND / .294	92.4			
20		B23-5 (20'-25') Fine to medium grained; dark brown to white to orangish brown; micaceous silty sand; weathered mica and quartz fragments evident		B23-5		ND / 1.68	120.9			
25			25.0				2,739			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Log of Borehole: B23

Project: INTERIM AUTHORIZATION CAP IMP

Diagram of Monitoring Well: MW23

Client: T & M, M OF D, L.L.C.

Geologist: ADAM FLORA

Location: MEADOWS OF DAN FOOD MARKET

Generation Date: 01/13/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							1000	2000	3000		
26		B23-6 (25'-29') Fine to medium grained; dark to grayish brown; micaceous silty sand; strong petroleum odor					120.9				
27		Observed rod refusal approximately 29 feet bgs Converted from direct push to hollow-stem auger drilling techniques.		B23-6		86.1 / 677			2,739		
28			29.0								
29		No additional samples collected. Soil boring B23 converted to MW23 approximately 45' bgs.									
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45			45.0								
46		End of Borehole									
47											
48											
49											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B24

Diagram of Monitoring Well: MW24

Geologist: ADAM FLORA

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							12.5	25	37.5	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B24-1 (0.5'-5') Fine grained; dark to reddish brown; fatty micaceous silty sandy clay; saprolitic; no petroleum odor		B24-1		NA / NA	0.0			
2										
3										
4										
5			5.0							
6		B24-2 (5'-10') Fine to medium grained; reddish to dark brown; weathered micaceous sand; saprolitic; larger mica fragments evident; no petroleum odor		B24-2		NA / NA	0.0			
7										
8										
9										
10			10.0							
11		B24-3 (10'-15') Fine to medium grained; reddish to dark brown; weathered micaceous sand; saprolitic; larger mica and quartz fragments evident; no petroleum odor		B24-3		NA / NA	0.0			
12										
13										
14										
15			15.0							
16		B24-4 (15'-20') Fine to medium grained; light to reddish/orangish brown; micaceous silty sand with minor clay component; larger quartz fragments; saprolitic structure; slight petroleum odor		B24-4		ND / .294	9.8			
17										
18										
19										
20			20.0							
21		B24-5 (20'-25') Fine grained; dark to tannish brown with black seams; micaceous silty sand; slight petroleum odor		B24-5		ND / 1.68	8.2			
22										
23										
24										
25			25.0				0.1			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B24

Diagram of Monitoring Well: MW24

Geologist: ADAM FLORA

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							8.2	12.5	25	
26		B24-6 (25'-30') Fine to medium grained; reddish to light brown with black seams; micaceous silty sand; slight petroleum odor								
27				B24-6		86.1 / 677	2.7			
28										
29										
30			30.0							
31		B24-7 (30'-32') No sample collected								
32		Observed rod refusal approximatley 32 feet bgs Converted from direct push to hollow-stem auger drilling techniques.	32.0							
33		B24-8 (32'-35') Fine grained; dark brown; micaceous silty sand with minor clay component; moisture evident; slight petroleum odor.								
34				B24-8		NA / NA	0.1			
35			35.0							
36		No additional samples collected. Soil boring B24 converted to MW24 approximately 45' bgs								
37										
38										
39										
40										
41										
42										
43										
44										
45			45.0							
46		End of Borehole								
47										
48										
49										
50										

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B25

Diagram of Monitoring Well: MW25

Geologist: ADAM FLORA

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							500	1000	1500	
0		Ground Surface	0.0							
0.5		CONCRETE	0.5							
1		B25-1 (0.5'-5') Fine grained; grayish to light brown; micaceous silty sand with minor clay component; no petroleum odor		B25-1		ND / ND	0.6			
2										
3										
4										
5			5.0							
6		B25-2 (5'-10') Fine grained; light to reddish brown with black seams; micaceous silty sand; saprolitic; slight petroleum odor		B25-2		ND / .531	7.0			
7										
8										
9										
10			10.0							
11		B25-3 (10'-15') Fine grained; brown to tannish brown with black seams; micaceous silty sand; saprolitic; slight petroleum odor		B25-3		ND / ND	25.6			
12										
13										
14										
15			15.0							
16		B25-4 (15'-20') Fine to medium grained; brown to light brown with black seams; weathered micaceous silty sand; small rock fragments evident; petroleum odor		B25-4		13.6 / ND	39.0			
17										
18										
19										
20			20.0							
21		B25-5 (20'-25') Fine to medium grained; brown to tannish brown with black seams; weathered micaceous silty sand; small rock fragments evident; petroleum odor		B25-5		ND / ND	57.3			
22										
23										
24										
25			25.0				133			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B25

Diagram of Monitoring Well: MW25

Geologist: ADAM FLORA

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							500	1000	1500		
26		B25-6 (25'-30') Fine to medium grained; tannish brown; micaceous silty clay; small rock fragments evident; strong petroleum odor					57.3				
27				B25-6		63.9 / 4,760		757.7			
28											
29											
30			30.0								
31		B25-7 (30'-32') Fine grained; tan to grayish brown; micaceous silty sandy clay; weathered saprolitic texture; petroleum odor									
32			32.0	B25-7		ND / 3.67		153.3			
33		Observed rod refusal approximatley 32 feet bgs Converted from direct push to hollow-stem auger drilling techniques.									
34		B25-8 (32'-35') Fine grained; dark brown; micaceous silty clay; petroleum odor.									
35			35.0	B25-8		ND / 0.770		133			
36		No additional samples collected. Soil boring B25 converted to MW25 approximately 45' bgs									
37											
38											
39											
40											
41											
42											
43											
44											
45			45.0								
46		End of Borehole									
47											
48											
49											
50											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B26

Diagram of Monitoring Well: MW26

Geologist: ADAM FLORA

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							1500	3000	4500	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B26-1 (0.5'-5') Fine grained; brown to reddish brown with black seams; micaceous silty sand; saprolitic; no petroleum odor		B26-1		NA / NA	0.0			
2										
3										
4										
5			5.0							
6		B26-2 (5'-10') Fine grained; brown with black seams; micaceous silty sand with minor clay component; saprolitic; no petroleum odor		B26-2		NA / NA	1.5			
7										
8										
9										
10			10.0							
11		B26-3 (10'-15') Fine to medium grained; brown to reddish brown with black seams; micaceous silty sand; weathered rock fragments evident; slight petroleum odor		B26-3		NA / NA	5.5			
12										
13										
14										
15			15.0							
16		B26-4 (15'-20') Fine grained brown; micaceous silty sand with minor clay component; saprolitic; slight petroleum odor		B26-4		ND / .385	23.1			
17										
18										
19										
20			20.0							
21		B26-5 (20'-25') Fine to medium grained; brown to reddish brown micaceous silty clay; larger mica fragments; slight petroleum odor		B26-5		ND / .497	27.8			
22										
23										
24										
25			25.0				5,939			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER

Drilled by: DAVIDSON DRILLING, INC.

Drill Date: 07/31/14 & 08/01/14

Hole Size: 6.875 INCHES



Project No: FMMD1004

Log of Borehole: B26

Project: INTERIM AUTHORIZATION CAP IMP

Diagram of Monitoring Well: MW26

Client: T & M, M OF D, L.L.C.

Geologist: ADAM FLORA

Location: MEADOWS OF DAN FOOD MARKET

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE		PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							1500	3000	4500	
26		B26-6 (25'-28') Fine to medium grained; brown to reddish brown micaceous silty clay; larger mica fragments; strong petroleum odor		B26-6		6.42 / 430	27.8			<p>#3 Silica Sand (DTP) - 30.95' - (11/05/14)</p> <p>2" Slotted Screen</p> <p>(DTW) - 34.82' - (11/05/14)</p>
27		Observed rod refusal approximately 28 feet bgs Converted from direct push to hollow-stem auger drilling techniques.	28.0				218.1			
28		B26-7 (28'-30') Fine grained; light brown; micaceous silty sand; moisture evident; strong petroleum odor		B26-7		ND / 2.36	115.2			
29		B26-8 (30'-35') Fine grained; dark brown; micaceous silty sand; very strong petroleum odor.		B26-8		23.3 / 354				
30			30.0							
31										
32										
33										
34										
35			35.0					5,939		
36		No additional samples collected. Soil boring B26 converted to MW26 approximately 45' bgs								
37										
38										
39										
40										
41										
42										
43										
44										
45			45.0							
46		End of Borehole								
47										
48										
49										
50										

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B27

Diagram of Monitoring Well: MW27

Geologist: ADAM FLORA

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							2.5	5	7.5	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B27-1 (0.5'-5') Fine grained; reddish brown with white seams; micaceous silty clay; no petroleum odor		B27-1		NA / NA	0.0			
5		B27-2 (5'-10') Fine grained; reddish brown with white and black seams; micaceous silty clay; no petroleum odor	5.0	B27-2		NA / NA	0.0			
10		B27-3 (10'-15') Fine grained; brown to dark orangish brown with white and black seams; micaceous silty clay with minor sand component; no petroleum odor	10.0	B27-3		NA / NA	0.0			
15		B27-4 (15'-20') Fine grained; dark brown with white and black seams; micaceous silty clay with minor sand component; no petroleum odor	15.0	B27-4		ND / ND	0.6			
20		B27-5 (20'-25') Fine grained; dark to light brown with mottled seams; micaceous silty sandy clay; slight petroleum odor	20.0	B27-5		5.35 / ND	0.0			
25			25.0				0.5			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B27

Diagram of Monitoring Well: MW27

Geologist: ADAM FLORA

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE		PID READINGS			MONITORING WELL DIAGRAM		
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							0.0	2.5	5	7.5	
26		B27-6 (25'-27') Fine grained; dark to light brown with mottled seams; micaceous silty sandy clay; slight petroleum odor	27.0	B27-6		5.58 / ND	0.1				<p>#3 Silica Sand</p> <p>(DTW) - 30.47' - (1/15/14)</p> <p>2" Slotted Screen</p>
27		Observed rod refusal approximately 27 feet bgs Converted from direct push to hollow-stem auger drilling techniques.									
28		B27-7 (27'-30') Fine grained; dark brown with mottled seams; micaceous silty sand; slight petroleum odor	30.0	B27-7		ND / ND	0.3				
29											
30		B27-8 (30'-35') Fine grained; light brown with white seams; micaceous silty sand; slight petroleum odor		B27-8		ND / ND	0.5				
31											
32											
33											
34											
35		No additional samples taken. Converted B27 into MW27 at approximately 45 feet bgs	45.0								
36											
37											
38											
39											
40											
41											
42											
43											
44											
45		End of Borehole									
46											
47											
48											
49											
50											

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



Project No: FMMD1004

Project: INTERIM AUTHORIZATION CAP IMP

Client: T & M, M OF D, L.L.C.

Location: MEADOWS OF DAN FOOD MARKET

Log of Borehole: B28

Diagram of Monitoring Well: MW28

Geologist: ADAM FLORA

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details
							2000	4000	6000	
0		Ground Surface	0.0							
0.5		ASPHALT	0.5							
1		B28-1 (0.5'-5') Fine grained; Red to tannish brown with black seams; silty sandy clay; saprolitic; no petroleum odor		B28-1		NA / NA	0.0			
2										
3										
4										
5			5.0							
6		B28-2 (5'-10') Fine to medium grained; light brown with black seams; silty clay; larger rock fragments evident; saprolitic; no petroleum odor		B28-2		NA / NA	0.0			
7										
8										
9										
10			10.0							
11		B28-3 (10'-15') Fine to medium grained; brown to tannish brown with black seams; micaceous silty sand; larger quartz fragments evident; no petroleum odor		B28-3		NA / NA	0.0			
12										
13										
14										
15			15.0							
16		B28-4 (15'-20') Fine grained; light brown; weathered micaceous silty sand; slight petroleum odor		B28-4		ND / ND	0.1			
17										
18										
19										
20			20.0							
21		B28-5 (20'-24') Fine grained; light brown; weathered micaceous silty sand; slight petroleum odor		B28-5		ND / ND	1.1			
22		Observed rod refusal approximatley 24 feet bgs Converted from direct push to hollow-stem auger drilling techniques.								
23										
24			24.0				7,137			

Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER

Drilled by: DAVIDSON DRILLING, INC.

Drill Date: 07/31/14 & 08/01/14

Hole Size: 6.875 INCHES



Project No: FMMD1004

Log of Borehole: B28

Project: INTERIM AUTHORIZATION CAP IMP

Diagram of Monitoring Well: MW28

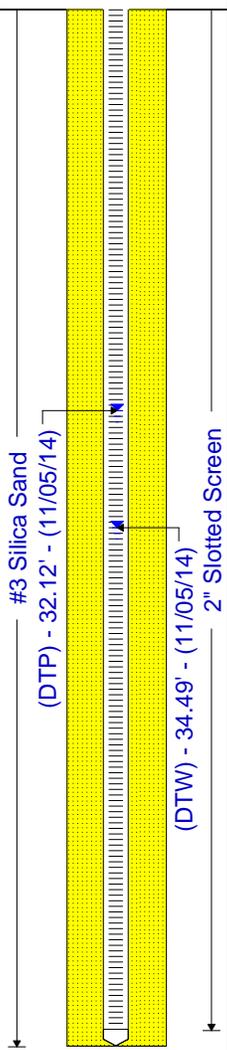
Client: T & M, M OF D, L.L.C.

Geologist: ADAM FLORA

Location: MEADOWS OF DAN FOOD MARKET

Generation Date: 01/15/15

SUBSURFACE PROFILE				SAMPLE			PID READINGS			MONITORING WELL DIAGRAM	
Depth	Symbol	Description	Depth	Number	Type	Lab Results (TPH-DRO) (TPH-GRO)	VOC Concentration ppm			Well Completion Details	
							2000	4000	6000		
25		B28-6 (24'-30') Fine grained; light brown; micaceous silty sand; moisture evident; slight petroleum odor									
26											
27				B28-6		ND / ND					
28											
29											
30			30.0								
31		B28-7 (30'-35') Fine grained; light brown; micaceous silty sand; groundwater present; strong petroleum odor									
32											
33				B28-7		129 / 1,860					
34											
35			35.0								
36		No additional samples collected. Soil boring B28 converted to MW28 approximately 45' bgs									
37											
38											
39											
40											
41											
42											
43											
44											
45			45.0								
46		End of Borehole									
47											
48											



Drill Method: DIRECT PUSH/HOLLOW-STEM AUGER
 Drilled by: DAVIDSON DRILLING, INC.
 Drill Date: 07/31/14 & 08/01/14
 Hole Size: 6.875 INCHES



APPENDIX D

Laboratory Data

Laboratory Test Results
Chain of Custody Documentation



REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
Website: www.reiclabs.com

Improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Thursday, April 09, 2015

Mr. Trev Greene
GREENE ENVIRONMENTAL SERVICES, LLC
200 BUCKWHEAT LANE
ROCKY MOUNT, VA 24151

TEL: (540) 483-3311

FAX:

RE: FMMD1005

Work Order #: 1503Z12

Dear Mr. Trev Greene:

REI Consultants, Inc. received 1 sample(s) on 3/30/2015 for the analyses presented in the following report.

Sincerely,

Billy Shirley



Client: GREENE ENVIRONMENTAL SERVICES, LLC

Project: FMMD1005

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP (and/or VELAP) requirements for parameters except as noted in this report.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

This report may not be reproduced, except in full, without the written approval of REIC.

DEFINITIONS:

MCL: Maximum Contaminant Level

MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.

Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).

NA: Not Applicable

ND: Not Detected at the PQL or MDL

PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.

Qual: Qualifier that applies to the analyte reported.

TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.

Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:

X: Reported value exceeds required MCL

B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL

E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be consider estimated.

H: Holding time for preparation or analysis has been exceeded.

J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.

S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:

Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148

Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460148, PADEP 68-00839

Roanoke, VA: VADCLS(VELAP) 460150

Verona, VA: VADCLS(VELAP) 460151

Ashland, KY: KYDEP 00094, WV 389

Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1503Z12

Date Reported: 4/9/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	3/30/2015 7:55:00 AM
Project:	FMMD1005	Date Received:	3/30/2015
Lab ID:	1503Z12-01A	Matrix:	Liquid
Client Sample ID:	DW04	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
SEMIVOLATILE ORGANIC COMPOUNDS									
						Method: SW8270D (2007)		Analyst: JD	
Acenaphthene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Acenaphthylene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Anthracene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Benzdine	ND	5.02	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Benzo(a)anthracene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Benzo(a)pyrene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Benzo(b)fluoranthene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Benzo(g,h,i)perylene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Benzo(k)fluoranthene	ND	3.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Bis(2-chloroethoxy)methane	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Bis(2-chloroethyl)ether	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Bis(2-chloroisopropyl)ether	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Bis(2-ethylhexyl)phthalate	7.10	5.02	10.0	NA	J	µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
4-Bromophenyl phenyl ether	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Butyl benzyl phthalate	ND	5.02	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
4-Chloro-3-methylphenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
2-Chloronaphthalene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
2-Chlorophenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
4-Chlorophenyl phenyl ether	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Chrysene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
o-Cresol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
m,p-Cresol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Dibenzo(a,h)anthracene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Di-n-butyl phthalate	ND	5.02	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
1,2-Dichlorobenzene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
1,3-Dichlorobenzene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
1,4-Dichlorobenzene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
3,3'-Dichlorobenzidine	ND	5.02	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
2,4-Dichlorophenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Diethyl phthalate	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Dimethyl phthalate	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
2,4-Dimethylphenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
4,6-Dinitro-2-methylphenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
2,4-Dinitrophenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
2,4-Dinitrotoluene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
2,6-Dinitrotoluene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Di-n-octyl phthalate	ND	5.02	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
1,2-Diphenylhydrazine	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Fluoranthene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Fluorene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1503Z12

Date Reported: 4/9/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	3/30/2015 7:55:00 AM
Project:	FMMD1005	Date Received:	3/30/2015
Lab ID:	1503Z12-01A	Matrix:	Liquid
Client Sample ID:	DW04	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
Hexachlorobenzene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Hexachlorobutadiene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Hexachlorocyclopentadiene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Hexachloroethane	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Indeno(1,2,3-cd)pyrene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Isophorone	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Naphthalene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Nitrobenzene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
2-Nitrophenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
4-Nitrophenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
N-Nitrosodimethylamine	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
N-Nitrosodiphenylamine	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
N-Nitrosodi-n-propylamine	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Pentachlorophenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Phenanthrene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Phenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Pyrene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
1,2,4-Trichlorobenzene	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	
2,4,5-Trichlorophenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
2,4,6-Trichlorophenol	ND	2.01	10.0	NA		µg/L	04/02/15 11:38AM	04/05/15 2:31AM	PA/VA
Surr: 2-Fluorophenol	34.7	NA	26.6-110	NA		%REC	04/02/15 11:38AM	04/05/15 2:31AM	
Surr: Phenol-d5	27.6	NA	10.9-110	NA		%REC	04/02/15 11:38AM	04/05/15 2:31AM	
Surr: 2,4,6-Tribromophenol	61.6	NA	54.6-110	NA		%REC	04/02/15 11:38AM	04/05/15 2:31AM	
Surr: Nitrobenzene-d5	73.0	NA	32.5-110	NA		%REC	04/02/15 11:38AM	04/05/15 2:31AM	
Surr: 2-Fluorobiphenyl	71.6	NA	40.5-110	NA		%REC	04/02/15 11:38AM	04/05/15 2:31AM	
Surr: 4-Terphenyl-d14	82.6	NA	53.8-110	NA		%REC	04/02/15 11:38AM	04/05/15 2:31AM	

Notes:

The associated batch matrix spike exceeds REIC control limits.

VOLATILE ORGANIC COMPOUNDS-8260

Method: SW8260B (1996)

Analyst: JM

trans-1,4-Dichloro-2-butene	ND	5.00	10.0	NA		µg/L		04/07/15 5:25PM	
Acetone	ND	5.00	10.0	NA		µg/L		04/07/15 5:25PM	PA/VA
Acrolein	ND	5.00	10.0	NA		µg/L		04/07/15 5:25PM	PA/VA
Acrylonitrile	ND	5.00	10.0	NA		µg/L		04/07/15 5:25PM	PA/VA
Benzene	21.9	0.500	1.00	NA		µg/L		04/07/15 5:25PM	PA/VA
Bromobenzene	ND	0.500	1.00	NA		µg/L		04/07/15 5:25PM	PA/VA
Bromochloromethane	ND	0.500	1.00	NA		µg/L		04/07/15 5:25PM	PA/VA
Bromodichloromethane	ND	0.500	1.00	NA		µg/L		04/07/15 5:25PM	PA/VA
Bromoform	ND	0.500	1.00	NA		µg/L		04/07/15 5:25PM	PA/VA
Bromomethane	ND	0.500	1.00	NA		µg/L		04/07/15 5:25PM	PA/VA
MEK	ND	5.00	10.0	NA		µg/L		04/07/15 5:25PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1503Z12

Date Reported: 4/9/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	3/30/2015 7:55:00 AM
Project:	FMMD1005	Date Received:	3/30/2015
Lab ID:	1503Z12-01A	Matrix:	Liquid
Client Sample ID:	DW04	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
n-Butylbenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
sec-Butylbenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
tert-Butylbenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Carbon disulfide	ND	2.50	5.00	NA		µg/L	04/07/15 5:25PM		
Carbon tetrachloride	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Chlorobenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Chloroethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Chloroform	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Chloromethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
2-Chlorotoluene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
4-Chlorotoluene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Dibromochloromethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
DBCP	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,2-Dibromoethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Dibromomethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,2-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,3-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,4-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Dichlorodifluoromethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,1-Dichloroethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,2-Dichloroethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,1-Dichloroethene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
cis-1,2-Dichloroethene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
trans-1,2-Dichloroethene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,2-Dichloropropane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,3-Dichloropropane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
2,2-Dichloropropane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,1-Dichloropropene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
cis-1,3-Dichloropropene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
trans-1,3-Dichloropropene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Ethylbenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Hexachlorobutadiene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
2-Hexanone	ND	5.00	10.0	NA		µg/L	04/07/15 5:25PM	PA/VA	
Iodomethane	ND	5.00	10.0	NA		µg/L	04/07/15 5:25PM	PA/VA	
Isopropylbenzene	0.960	0.500	1.00	NA	J	µg/L	04/07/15 5:25PM	PA/VA	
p-Isopropyltoluene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Methylene chloride	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
4-Methyl-2-pentanone	ND	5.00	10.0	NA		µg/L	04/07/15 5:25PM	PA/VA	
MTBE	47.6	2.50	5.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Naphthalene	1.81	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
n-Propylbenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	

REI Consultants, Inc. - Analytical Report

WO#: 1503Z12

Date Reported: 4/9/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	3/30/2015 7:55:00 AM
Project:	FMMD1005	Date Received:	3/30/2015
Lab ID:	1503Z12-01A	Matrix:	Liquid
Client Sample ID:	DW04	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
Styrene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,1,1,2-Tetrachloroethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,1,2,2-Tetrachloroethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Tetrachloroethene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Toluene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,2,3-Trichlorobenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,2,4-Trichlorobenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,1,1-Trichloroethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,1,2-Trichloroethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Trichloroethene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Trichlorofluoromethane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,2,3-Trichloropropane	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,2,4-Trimethylbenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
1,3,5-Trimethylbenzene	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Vinyl acetate	ND	5.00	10.0	NA		µg/L	04/07/15 5:25PM	PA/VA	
Vinyl chloride	ND	0.500	1.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
o-Xylene	26.9	5.00	10.0	NA		µg/L	04/07/15 6:31PM	PA/VA	
m,p-Xylene	ND	1.00	2.00	NA		µg/L	04/07/15 5:25PM	PA/VA	
Surr: 1,2-Dichloroethane-d4	95.2	NA	68.7-129	NA		%REC	04/07/15 5:25PM		
Surr: 4-Bromofluorobenzene	113	NA	71.8-127	NA		%REC	04/07/15 5:25PM		
Surr: Dibromofluoromethane	95.2	NA	74.3-124	NA		%REC	04/07/15 5:25PM		
Surr: Toluene-d8	90.8	NA	71.4-129	NA		%REC	04/07/15 5:25PM		



REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
Website: www.reiclabs.com

Improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Thursday, April 23, 2015

Mr. Trev Greene
GREENE ENVIRONMENTAL SERVICES, LLC
200 BUCKWHEAT LANE
ROCKY MOUNT, VA 24151

TEL: (540) 483-3311

FAX:

RE: FMMD1005

Work Order #: 1504O48

Dear Mr. Trev Greene:

REI Consultants, Inc. received 1 sample(s) on 4/21/2015 for the analyses presented in the following report.

Sincerely,

Billy Shirley



Client: GREENE ENVIRONMENTAL SERVICES, LLC

Project: FMMD1005

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP (and/or VELAP) requirements for parameters except as noted in this report.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

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DEFINITIONS:

MCL: Maximum Contaminant Level

MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.

Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).

NA: Not Applicable

ND: Not Detected at the PQL or MDL

PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.

Qual: Qualifier that applies to the analyte reported.

TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.

Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:

X: Reported value exceeds required MCL

B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL

E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be consider estimated.

H: Holding time for preparation or analysis has been exceeded.

J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.

S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:

Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148

Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460148, PADEP 68-00839

Roanoke, VA: VADCLS(VELAP) 460150

Verona, VA: VADCLS(VELAP) 460151

Ashland, KY: KYDEP 00094, WV 389

Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1504048

Date Reported: 4/23/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	4/20/2015 7:40:00 AM
Project:	FMMD1005	Date Received:	4/21/2015
Lab ID:	1504048-01A	Matrix:	Liquid
Client Sample ID:	DW04	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC	
SEMIVOLATILE ORGANIC COMPOUNDS			Method: SW8270D (2007)				Analyst: JD			
Acenaphthene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Acenaphthylene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Anthracene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Benzdine	ND	5.04	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Benzo(a)anthracene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Benzo(a)pyrene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Benzo(b)fluoranthene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Benzo(g,h,i)perylene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Benzo(k)fluoranthene	ND	3.03	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Bis(2-chloroethoxy)methane	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Bis(2-chloroethyl)ether	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Bis(2-chloroisopropyl)ether	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Bis(2-ethylhexyl)phthalate	ND	5.04	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
4-Bromophenyl phenyl ether	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Butyl benzyl phthalate	ND	5.04	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
4-Chloro-3-methylphenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
2-Chloronaphthalene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
2-Chlorophenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
4-Chlorophenyl phenyl ether	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Chrysene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
o-Cresol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
m,p-Cresol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Dibenzo(a,h)anthracene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Di-n-butyl phthalate	ND	5.04	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
1,2-Dichlorobenzene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
1,3-Dichlorobenzene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
1,4-Dichlorobenzene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
3,3'-Dichlorobenzidine	ND	5.04	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
2,4-Dichlorophenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Diethyl phthalate	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Dimethyl phthalate	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
2,4-Dimethylphenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
4,6-Dinitro-2-methylphenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
2,4-Dinitrophenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
2,4-Dinitrotoluene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
2,6-Dinitrotoluene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Di-n-octyl phthalate	ND	5.04	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
1,2-Diphenylhydrazine	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Fluoranthene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	
Fluorene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA	

REI Consultants, Inc. - Analytical Report

WO#: 1504048

Date Reported: 4/23/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	4/20/2015 7:40:00 AM
Project:	FMMD1005	Date Received:	4/21/2015
Lab ID:	1504048-01A	Matrix:	Liquid
Client Sample ID:	DW04	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
Hexachlorobenzene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Hexachlorobutadiene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Hexachlorocyclopentadiene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Hexachloroethane	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Indeno(1,2,3-cd)pyrene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Isophorone	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Naphthalene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Nitrobenzene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
2-Nitrophenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
4-Nitrophenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
N-Nitrosodimethylamine	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
N-Nitrosodiphenylamine	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
N-Nitrosodi-n-propylamine	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Pentachlorophenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Phenanthrene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Phenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Pyrene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
1,2,4-Trichlorobenzene	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
2,4,5-Trichlorophenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
2,4,6-Trichlorophenol	ND	2.02	10.1	NA		µg/L	04/21/15 11:18AM	04/22/15 1:30PM	PA/VA
Surr: 2-Fluorophenol	45.0	NA	26.6-110	NA		%REC	04/21/15 11:18AM	04/22/15 1:30PM	
Surr: Phenol-d5	33.1	NA	10.9-110	NA		%REC	04/21/15 11:18AM	04/22/15 1:30PM	
Surr: 2,4,6-Tribromophenol	85.1	NA	54.6-110	NA		%REC	04/21/15 11:18AM	04/22/15 1:30PM	
Surr: Nitrobenzene-d5	97.9	NA	32.5-110	NA		%REC	04/21/15 11:18AM	04/22/15 1:30PM	
Surr: 2-Fluorobiphenyl	93.8	NA	40.5-110	NA		%REC	04/21/15 11:18AM	04/22/15 1:30PM	
Surr: 4-Terphenyl-d14	94.8	NA	53.8-110	NA		%REC	04/21/15 11:18AM	04/22/15 1:30PM	

Notes:

The associated batch matrix spike exceeds REIC control limits.

VOLATILE ORGANIC COMPOUNDS-8260

Method: SW8260B (1996)

Analyst: JM

trans-1,4-Dichloro-2-butene	ND	5.00	10.0	NA		µg/L		04/22/15 10:12PM	
Acetone	ND	5.00	10.0	NA		µg/L		04/22/15 10:12PM	PA/VA
Acrolein	ND	5.00	10.0	NA		µg/L		04/22/15 10:12PM	PA/VA
Acrylonitrile	ND	5.00	10.0	NA		µg/L		04/22/15 10:12PM	PA/VA
Benzene	16.0	0.500	1.00	NA		µg/L		04/22/15 10:12PM	PA/VA
Bromobenzene	ND	0.500	1.00	NA		µg/L		04/22/15 10:12PM	PA/VA
Bromochloromethane	ND	0.500	1.00	NA		µg/L		04/22/15 10:12PM	PA/VA
Bromodichloromethane	ND	0.500	1.00	NA		µg/L		04/22/15 10:12PM	PA/VA
Bromoform	ND	0.500	1.00	NA		µg/L		04/22/15 10:12PM	PA/VA
Bromomethane	ND	0.500	1.00	NA		µg/L		04/22/15 10:12PM	PA/VA
MEK	ND	5.00	10.0	NA		µg/L		04/22/15 10:12PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1504048

Date Reported: 4/23/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	4/20/2015 7:40:00 AM
Project:	FMMD1005	Date Received:	4/21/2015
Lab ID:	1504048-01A	Matrix:	Liquid
Client Sample ID:	DW04	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
n-Butylbenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
sec-Butylbenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
tert-Butylbenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Carbon disulfide	ND	2.50	5.00	NA		µg/L	04/22/15 10:12PM		
Carbon tetrachloride	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Chlorobenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Chloroethane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Chloroform	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Chloromethane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
2-Chlorotoluene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
4-Chlorotoluene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Dibromochloromethane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
DBCP	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,2-Dibromoethane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Dibromomethane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,2-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,3-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,4-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Dichlorodifluoromethane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,1-Dichloroethane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,2-Dichloroethane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,1-Dichloroethene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
cis-1,2-Dichloroethene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
trans-1,2-Dichloroethene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,2-Dichloropropane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,3-Dichloropropane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
2,2-Dichloropropane	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
1,1-Dichloropropene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
cis-1,3-Dichloropropene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
trans-1,3-Dichloropropene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Ethylbenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Hexachlorobutadiene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
2-Hexanone	ND	5.00	10.0	NA		µg/L	04/22/15 10:12PM	PAVA	
Iodomethane	ND	5.00	10.0	NA		µg/L	04/22/15 10:12PM	PAVA	
Isopropylbenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
p-Isopropyltoluene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Methylene chloride	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
4-Methyl-2-pentanone	ND	5.00	10.0	NA		µg/L	04/22/15 10:12PM	PAVA	
MTBE	34.9	2.50	5.00	NA		µg/L	04/22/15 10:12PM	PAVA	
Naphthalene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	
n-Propylbenzene	ND	0.500	1.00	NA		µg/L	04/22/15 10:12PM	PAVA	

REI Consultants, Inc. - Analytical Report

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Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	4/20/2015 7:40:00 AM
Project:	FMMD1005	Date Received:	4/21/2015
Lab ID:	1504O48-01A	Matrix:	Liquid
Client Sample ID:	DW04	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL Qual	Units	Prep Date	Date Analyzed	NELAC
Styrene	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
1,1,1,2-Tetrachloroethane	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
1,1,2,2-Tetrachloroethane	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
Tetrachloroethene	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
Toluene	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
1,2,3-Trichlorobenzene	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
1,2,4-Trichlorobenzene	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
1,1,1-Trichloroethane	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
1,1,2-Trichloroethane	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
Trichloroethene	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
Trichlorofluoromethane	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
1,2,3-Trichloropropane	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
1,2,4-Trimethylbenzene	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
1,3,5-Trimethylbenzene	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
Vinyl acetate	ND	5.00	10.0	NA	µg/L	04/22/15	10:12PM	PA/VA
Vinyl chloride	ND	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
o-Xylene	24.3	0.500	1.00	NA	µg/L	04/22/15	10:12PM	PA/VA
m,p-Xylene	ND	1.00	2.00	NA	µg/L	04/22/15	10:12PM	PA/VA
Surr: 1,2-Dichloroethane-d4	89.4	NA	68.7-129	NA	%REC	04/22/15	10:12PM	
Surr: 4-Bromofluorobenzene	95.1	NA	71.8-127	NA	%REC	04/22/15	10:12PM	
Surr: Dibromofluoromethane	95.5	NA	74.3-124	NA	%REC	04/22/15	10:12PM	
Surr: Toluene-d8	101	NA	71.4-129	NA	%REC	04/22/15	10:12PM	



Improving the environment, one client at a time...

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304)255-2500
Website: www.reiclabs.com

Sample Receipt Checklist

Client Name: GRE096 Work Order Number: 1504048
RCPNo: 1 Date and Time Received: 4/21/2015 10:00:50 PM Received by: Ryan Pollock
Completed By: Brandon Cole Reviewed By: Billy Shirley
Completed Date: 4/21/2015 10:02:02 PM Reviewed Date: 4/22/2015 7:14 AM

Carrier Name: REIC

- 1. Chain of custody present? Yes [x] No []
2. Chain of custody signed when relinquished and received? Yes [x] No []
3. Are matrices correctly identified on Chain of custody? Yes [x] No []
4. Is it clear what analyses were requested? Yes [x] No []
5. Custody seals intact? Yes [] No [] Not Present [x]
6. Samples in proper container/bottle? Yes [x] No []
7. Were correct preservatives indicated? Yes [x] No [] NA []
8. Sample containers intact? Yes [x] No []
9. Sufficient sample volume for indicated test? Yes [x] No []
10. Were container lables complete? Yes [x] No []
11. All samples received within holding time? Yes [x] No []
12. Was an attempt made to cool the samples? Yes [x] No [] NA []
13. Sample Temp. taken and recorded upon receipt? Yes [x] No [] To 1 °C
14. Water - Were bubbles absent in VOC vials? Yes [x] No [] No Vials []
15. Are Samples considered acceptable? Yes [x] No []

Client Notification/Response

Client Name: GRE096 Work Order Number: 1504048
Comment:
Client Contacted: Yes [] No [] NA [x] Person Contacted:
Contact Mode: Phone [] Fax: [] Email: [] In Person: []
Date Contacted: Contacted By:
Regarding:
Client Instructions:



REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
Website: www.reiclabs.com

Improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Monday, May 11, 2015

Mr. Trev Greene
GREENE ENVIRONMENTAL SERVICES, LLC
200 BUCKWHEAT LANE
ROCKY MOUNT, VA 24151

TEL: (540) 483-3311

FAX:

RE: FMMD1005

Work Order #: 1505161

Dear Mr. Trev Greene:

REI Consultants, Inc. received 1 sample(s) on 5/1/2015 for the analyses presented in the following report.

Sincerely,

Billy Shirley



Client: GREENE ENVIRONMENTAL SERVICES, LLC

Project: FMMD1005

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP (and/or VELAP) requirements for parameters except as noted in this report.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

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DEFINITIONS:

MCL: Maximum Contaminant Level

MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.

Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).

NA: Not Applicable

ND: Not Detected at the PQL or MDL

PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.

Qual: Qualifier that applies to the analyte reported.

TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.

Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:

X: Reported value exceeds required MCL

B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL

E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be consider estimated.

H: Holding time for preparation or analysis has been exceeded.

J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.

S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:

Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148

Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460148, PADEP 68-00839

Roanoke, VA: VADCLS(VELAP) 460150

Verona, VA: VADCLS(VELAP) 460151

Ashland, KY: KYDEP 00094, WV 389

Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1505161

Date Reported: 5/11/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	4/30/2015 8:35:00 AM
Project:	FMMMD1005	Date Received:	5/1/2015
Lab ID:	1505161-01A	Matrix:	Liquid
Client Sample ID:	DW03	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC	
SEMIVOLATILE ORGANIC COMPOUNDS			Method: SW8270D (2007)				Analyst: JD			
Acenaphthene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Acenaphthylene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Anthracene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Benzidine	ND	5.12	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Benzo(a)anthracene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Benzo(a)pyrene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Benzo(b)fluoranthene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Benzo(g,h,i)perylene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Benzo(k)fluoranthene	ND	3.07	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Bis(2-chloroethoxy)methane	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Bis(2-chloroethyl)ether	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Bis(2-chloroisopropyl)ether	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Bis(2-ethylhexyl)phthalate	ND	5.12	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
4-Bromophenyl phenyl ether	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Butyl benzyl phthalate	ND	5.12	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
4-Chloro-3-methylphenol	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
2-Chloronaphthalene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
2-Chlorophenol	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
4-Chlorophenyl phenyl ether	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Chrysene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
o-Cresol	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
m,p-Cresol	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Dibenzo(a,h)anthracene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Di-n-butyl phthalate	ND	5.12	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
1,2-Dichlorobenzene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
1,3-Dichlorobenzene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
1,4-Dichlorobenzene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
3,3'-Dichlorobenzidine	ND	5.12	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
2,4-Dichlorophenol	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Diethyl phthalate	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Dimethyl phthalate	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
2,4-Dimethylphenol	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
4,6-Dinitro-2-methylphenol	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
2,4-Dinitrophenol	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
2,4-Dinitrotoluene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
2,6-Dinitrotoluene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Di-n-octyl phthalate	ND	5.12	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
1,2-Diphenylhydrazine	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Fluoranthene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	
Fluorene	ND	2.05	10.2	NA		µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA	

REI Consultants, Inc. - Analytical Report

WO#: 1505161

Date Reported: 5/11/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	4/30/2015 8:35:00 AM
Project:	FMMD1005	Date Received:	5/1/2015
Lab ID:	1505161-01A	Matrix:	Liquid
Client Sample ID:	DW03	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL Qual	Units	Prep Date	Date Analyzed	NELAC
Hexachlorobenzene	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Hexachlorobutadiene	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Hexachlorocyclopentadiene	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Hexachloroethane	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Indeno(1,2,3-cd)pyrene	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Isophorone	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Naphthalene	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Nitrobenzene	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
2-Nitrophenol	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
4-Nitrophenol	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
N-Nitrosodimethylamine	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
N-Nitrosodiphenylamine	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
N-Nitrosodi-n-propylamine	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Pentachlorophenol	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Phenanthrene	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Phenol	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Pyrene	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
1,2,4-Trichlorobenzene	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
2,4,5-Trichlorophenol	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
2,4,6-Trichlorophenol	ND	2.05	10.2	NA	µg/L	05/06/15 4:41PM	05/08/15 9:19PM	PA/VA
Surr: 2-Fluorophenol	38.7	NA	26.6-110	NA	%REC	05/06/15 4:41PM	05/08/15 9:19PM	
Surr: Phenol-d5	28.1	NA	10.9-110	NA	%REC	05/06/15 4:41PM	05/08/15 9:19PM	
Surr: 2,4,6-Tribromophenol	61.3	NA	54.6-110	NA	%REC	05/06/15 4:41PM	05/08/15 9:19PM	
Surr: Nitrobenzene-d5	86.0	NA	32.5-110	NA	%REC	05/06/15 4:41PM	05/08/15 9:19PM	
Surr: 2-Fluorobiphenyl	85.5	NA	40.5-110	NA	%REC	05/06/15 4:41PM	05/08/15 9:19PM	
Surr: 4-Terphenyl-d14	87.4	NA	53.8-110	NA	%REC	05/06/15 4:41PM	05/08/15 9:19PM	

Notes:

The LCS for [analyte] exceeded REIC control limits indicating a high bias. Since the analyte result was ND, this exceedance does not adversely impact data usability.

VOLATILE ORGANIC COMPOUNDS-8260

Method: SW8260B (1996)

Analyst: TC

trans-1,4-Dichloro-2-butene	ND	5.00	10.0	NA	µg/L	05/06/15 11:05AM	
Acetone	ND	5.00	10.0	NA	µg/L	05/06/15 11:05AM	PA/VA
Acrolein	ND	5.00	10.0	NA	µg/L	05/06/15 11:05AM	PA/VA
Acrylonitrile	ND	5.00	10.0	NA	µg/L	05/06/15 11:05AM	PA/VA
Benzene	ND	0.500	1.00	NA	µg/L	05/06/15 11:05AM	PA/VA
Bromobenzene	ND	0.500	1.00	NA	µg/L	05/06/15 11:05AM	PA/VA
Bromochloromethane	ND	0.500	1.00	NA	µg/L	05/06/15 11:05AM	PA/VA
Bromodichloromethane	ND	0.500	1.00	NA	µg/L	05/06/15 11:05AM	PA/VA
Bromoform	ND	0.500	1.00	NA	µg/L	05/06/15 11:05AM	PA/VA
Bromomethane	ND	0.500	1.00	NA	µg/L	05/06/15 11:05AM	PA/VA
MEK	ND	5.00	10.0	NA	µg/L	05/06/15 11:05AM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1505161

Date Reported: 5/11/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	4/30/2015 8:35:00 AM
Project:	FMMD1005	Date Received:	5/1/2015
Lab ID:	1505161-01A	Matrix:	Liquid
Client Sample ID:	DW03	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
n-Butylbenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
sec-Butylbenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
tert-Butylbenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Carbon disulfide	ND	2.50	5.00	NA		µg/L	05/06/15	11:05AM	
Carbon tetrachloride	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Chlorobenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Chloroethane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Chloroform	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Chloromethane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
2-Chlorotoluene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
4-Chlorotoluene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Dibromochloromethane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
DBCP	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,2-Dibromoethane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Dibromomethane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,2-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,3-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,4-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Dichlorodifluoromethane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,1-Dichloroethane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,2-Dichloroethane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,1-Dichloroethene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
cis-1,2-Dichloroethene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
trans-1,2-Dichloroethene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,2-Dichloropropane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,3-Dichloropropane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
2,2-Dichloropropane	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
1,1-Dichloropropene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
cis-1,3-Dichloropropene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
trans-1,3-Dichloropropene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Ethylbenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Hexachlorobutadiene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
2-Hexanone	ND	5.00	10.0	NA		µg/L	05/06/15	11:05AM	PA/VA
Iodomethane	ND	5.00	10.0	NA		µg/L	05/06/15	11:05AM	PA/VA
Isopropylbenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
p-Isopropyltoluene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Methylene chloride	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
4-Methyl-2-pentanone	ND	5.00	10.0	NA		µg/L	05/06/15	11:05AM	PA/VA
MTBE	ND	2.50	5.00	NA		µg/L	05/06/15	11:05AM	PA/VA
Naphthalene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA
n-Propylbenzene	ND	0.500	1.00	NA		µg/L	05/06/15	11:05AM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1505161

Date Reported: 5/11/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	4/30/2015 8:35:00 AM
Project:	FMMD1005	Date Received:	5/1/2015
Lab ID:	1505161-01A	Matrix:	Liquid
Client Sample ID:	DW03	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL Qual	Units	Prep Date	Date Analyzed	NELAC
Styrene	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
1,1,1,2-Tetrachloroethane	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
1,1,2,2-Tetrachloroethane	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
Tetrachloroethene	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
Toluene	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
1,2,3-Trichlorobenzene	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
1,2,4-Trichlorobenzene	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
1,1,1-Trichloroethane	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
1,1,2-Trichloroethane	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
Trichloroethene	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
Trichlorofluoromethane	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
1,2,3-Trichloropropane	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
1,2,4-Trimethylbenzene	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
1,3,5-Trimethylbenzene	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
Vinyl acetate	ND	5.00	10.0	NA	µg/L	05/06/15	11:05AM	PA/VA
Vinyl chloride	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
o-Xylene	ND	0.500	1.00	NA	µg/L	05/06/15	11:05AM	PA/VA
m,p-Xylene	ND	1.00	2.00	NA	µg/L	05/06/15	11:05AM	PA/VA
Surr: 1,2-Dichloroethane-d4	99.4	NA	68.7-129	NA	%REC	05/06/15	11:05AM	
Surr: 4-Bromofluorobenzene	110	NA	71.8-127	NA	%REC	05/06/15	11:05AM	
Surr: Dibromofluoromethane	102	NA	74.3-124	NA	%REC	05/06/15	11:05AM	
Surr: Toluene-d8	98.9	NA	71.4-129	NA	%REC	05/06/15	11:05AM	



Improving the environment, one client at a time...

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304)255-2500
Website: www.reiclabs.com

Sample Receipt Checklist

Client Name: GRE096 Work Order Number: 1505161
RCPNo: 1 Date and Time Received: 5/1/2015 8:00:00 PM Received by: Brandon Cole
Completed By: Amanda Wilkins Reviewed By: Billy Shirley
Completed Date: 5/2/2015 4:41:22 PM Reviewed Date: 5/4/2015 8:27 AM

Carrier Name: REIC

- 1. Chain of custody present? Yes [x] No []
2. Chain of custody signed when relinquished and received? Yes [x] No []
3. Are matrices correctly identified on Chain of custody? Yes [x] No []
4. Is it clear what analyses were requested? Yes [x] No []
5. Custody seals intact? Yes [] No [] Not Present [x]
6. Samples in proper container type and preservative? Yes [x] No []
7. Were correct preservatives noted on COC? Yes [x] No [] NA []
8. Sample containers intact? Yes [x] No []
9. Sufficient sample volume for indicated test? Yes [x] No []
10. Were container lables complete? Yes [x] No []
11. All samples received within holding time? Yes [x] No []
12. Was an attempt made to cool the samples? Yes [x] No [] NA []
13. Sample Temp. taken and recorded upon receipt? Yes [x] No [] To 2 °C
14. Water - Were bubbles absent in VOC vials? Yes [x] No [] No Vials []
15. Are Samples considered acceptable? Yes [x] No []
16. COC filled out properly? Yes [x] No []

Client Notification/Response

Client Name: GRE096 Work Order Number: 1505161
Comment:
Client Contacted: Yes [] No [] NA [x] Person Contacted:
Contact Mode: Phone [] Fax: [] Email: [] In Person: []
Date Contacted: Contacted By:
Regarding:
Client Instructions:



REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304) 255-2500
Website: www.reiclabs.com

Improving the environment, one client at a time...

3029-C Peters Creek Road
Roanoke, VA 24019
TEL: 540.777.1276

101 17th Street
Ashland, KY 41101
TEL: 606.393.5027

1557 Commerce Road, Suite 201
Verona, VA 24482
TEL: 540.248.0183

16 Commerce Drive
Westover, WV 26501
TEL: 304.241.5861

Wednesday, May 27, 2015

Mr. Trev Greene
GREENE ENVIRONMENTAL SERVICES, LLC
200 BUCKWHEAT LANE
ROCKY MOUNT, VA 24151

TEL: (540) 483-3311

FAX:

RE: FMMD1005

Work Order #: 1505124

Dear Mr. Trev Greene:

REI Consultants, Inc. received 1 sample(s) on 5/15/2015 for the analyses presented in the following report.

Sincerely,

Billy Shirley



Client: GREENE ENVIRONMENTAL SERVICES, LLC**Project:** FMMD1005

The analytical results presented in this report were produced using documented laboratory SOPs that incorporate appropriate quality control procedures as described in the applicable methods. Verification of required sample preservation (as required) is recorded on associated laboratory logs. Any deviation from compliance or method modification is identified within the body of this report by a qualifier footnote which is defined at the bottom of this page.

All sample results for solid samples are reported on an "as-received" wet weight basis unless otherwise noted.

Results reported for sums of individual parameters, such as TTHM and HAA5, may vary slightly from the sum of the individual parameter results, due to rounding of individual results, as required by EPA.

The test results in this report meet all NELAP (and/or VELAP) requirements for parameters except as noted in this report.

Please note if the sample collection time is not provided on the Chain of Custody, the default recording will be 0:00:00. This may cause some tests to be apparently analyzed out of hold.

All tests performed by REIC Service Centers are designated by an annotation on the test code. All other tests were performed by REIC's Main Laboratory in Beaver, WV.

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DEFINITIONS:

MCL: Maximum Contaminant Level

MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.

Mg/Kg or mg/L: Units of part per million (PPM) - milligram per Kilogram (weight/weight) or milligram per Liter (weight/volume).

NA: Not Applicable

ND: Not Detected at the PQL or MDL

PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.

Qual: Qualifier that applies to the analyte reported.

TIC: Tentatively Identified Compound, Estimated Concentration denoted by "J" qualifier.

Ug/Kg or ug/L: Units of part per billion (PPB) - microgram per kilogram (weight/weight) or microgram per liter (weight/volume).

QUALIFIERS:

X: Reported value exceeds required MCL

B: Analyte detected in the associated Method Blank at a concentration > 1/2 the PQL

E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be consider estimated.

H: Holding time for preparation or analysis has been exceeded.

J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the MDL. The result reported is an estimate.

S: % REC (% recovery) exceeds control limits

CERTIFICATIONS:

Beaver, WV: WVDHHR 00412CM, WVDEP 060, VADCLS 00281, KYDEP 90039, TNDEQ TN02926, NCDWQ 466, PADEP 68-00839, VADCLS (VELAP) 460148

Bioassay (Beaver, WV): WVDEP 060, VADCLS(VELAP) 460148, PADEP 68-00839

Roanoke, VA: VADCLS(VELAP) 460150

Verona, VA: VADCLS(VELAP) 460151

Ashland, KY: KYDEP 00094, WV 389

Morgantown, WV: WVDHHR 003112M, WVDEP 387

REI Consultants, Inc. - Analytical Report

WO#: 1505I24

Date Reported: 5/27/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	5/12/2015 8:50:00 AM
Project:	FMMD1005	Date Received:	5/15/2015
Lab ID:	1505I24-01A	Matrix:	Liquid
Client Sample ID:	DW03	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
SEMIVOLATILE ORGANIC COMPOUNDS									
						Method: SW8270D (2007)	Analyst: JD		
Acenaphthene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Acenaphthylene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Anthracene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Benzydine	ND	5.02	10.0	NA		µg/L	05/18/15 8:28AM	05/21/15 1:51AM	PA/VA
Benzo(a)anthracene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Benzo(a)pyrene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Benzo(b)fluoranthene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Benzo(g,h,i)perylene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Benzo(k)fluoranthene	ND	3.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Bis(2-chloroethoxy)methane	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Bis(2-chloroethyl)ether	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Bis(2-chloroisopropyl)ether	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Bis(2-ethylhexyl)phthalate	ND	5.02	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
4-Bromophenyl phenyl ether	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Butyl benzyl phthalate	ND	5.02	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
4-Chloro-3-methylphenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2-Chloronaphthalene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2-Chlorophenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
4-Chlorophenyl phenyl ether	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Chrysene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
o-Cresol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
m,p-Cresol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Dibenzo(a,h)anthracene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Di-n-butyl phthalate	ND	5.02	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
1,2-Dichlorobenzene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
1,3-Dichlorobenzene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
1,4-Dichlorobenzene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
3,3'-Dichlorobenzidine	ND	5.02	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2,4-Dichlorophenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Diethyl phthalate	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Dimethyl phthalate	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2,4-Dimethylphenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
4,6-Dinitro-2-methylphenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2,4-Dinitrophenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2,4-Dinitrotoluene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2,6-Dinitrotoluene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Di-n-octyl phthalate	ND	5.02	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
1,2-Diphenylhydrazine	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	
Fluoranthene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Fluorene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1505I24

Date Reported: 5/27/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	5/12/2015 8:50:00 AM
Project:	FMMD1005	Date Received:	5/15/2015
Lab ID:	1505I24-01A	Matrix:	Liquid
Client Sample ID:	DW03	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
Hexachlorobenzene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Hexachlorobutadiene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Hexachlorocyclopentadiene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Hexachloroethane	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Indeno(1,2,3-cd)pyrene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Isophorone	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Naphthalene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Nitrobenzene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2-Nitrophenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
4-Nitrophenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
N-Nitrosodimethylamine	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
N-Nitrosodiphenylamine	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
N-Nitrosodi-n-propylamine	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Pentachlorophenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Phenanthrene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Phenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Pyrene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
1,2,4-Trichlorobenzene	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2,4,5-Trichlorophenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
2,4,6-Trichlorophenol	ND	2.01	10.0	NA		µg/L	05/18/15 8:28AM	05/19/15 6:36PM	PA/VA
Surr: 2-Fluorophenol	40.0	NA	26.6-110	NA		%REC	05/18/15 8:28AM	05/19/15 6:36PM	
Surr: Phenol-d5	30.8	NA	10.9-110	NA		%REC	05/18/15 8:28AM	05/19/15 6:36PM	
Surr: 2,4,6-Tribromophenol	83.6	NA	54.6-110	NA		%REC	05/18/15 8:28AM	05/19/15 6:36PM	
Surr: Nitrobenzene-d5	104	NA	32.5-110	NA		%REC	05/18/15 8:28AM	05/19/15 6:36PM	
Surr: 2-Fluorobiphenyl	95.8	NA	40.5-110	NA		%REC	05/18/15 8:28AM	05/19/15 6:36PM	
Surr: 4-Terphenyl-d14	93.8	NA	53.8-110	NA		%REC	05/18/15 8:28AM	05/19/15 6:36PM	

VOLATILE ORGANIC COMPOUNDS-8260

Method: SW8260B (1996)

Analyst: JM

trans-1,4-Dichloro-2-butene	ND	5.00	10.0	NA		µg/L		05/22/15 3:32PM	
Acetone	ND	5.00	10.0	NA		µg/L		05/22/15 3:32PM	PA/VA
Acrolein	ND	5.00	10.0	NA		µg/L		05/22/15 3:32PM	PA/VA
Acrylonitrile	ND	5.00	10.0	NA		µg/L		05/22/15 3:32PM	PA/VA
Benzene	ND	0.500	1.00	NA		µg/L		05/22/15 3:32PM	PA/VA
Bromobenzene	ND	0.500	1.00	NA		µg/L		05/22/15 3:32PM	PA/VA
Bromochloromethane	ND	0.500	1.00	NA		µg/L		05/22/15 3:32PM	PA/VA
Bromodichloromethane	ND	0.500	1.00	NA		µg/L		05/22/15 3:32PM	PA/VA
Bromoform	ND	0.500	1.00	NA		µg/L		05/22/15 3:32PM	PA/VA
Bromomethane	ND	0.500	1.00	NA		µg/L		05/22/15 3:32PM	PA/VA
MEK	ND	5.00	10.0	NA		µg/L		05/22/15 3:32PM	PA/VA
n-Butylbenzene	ND	0.500	1.00	NA		µg/L		05/22/15 3:32PM	PA/VA
sec-Butylbenzene	ND	0.500	1.00	NA		µg/L		05/22/15 3:32PM	PA/VA
tert-Butylbenzene	ND	0.500	1.00	NA		µg/L		05/22/15 3:32PM	PA/VA

REI Consultants, Inc. - Analytical Report

WO#: 1505I24

Date Reported: 5/27/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	5/12/2015 8:50:00 AM
Project:	FMMD1005	Date Received:	5/15/2015
Lab ID:	1505I24-01A	Matrix:	Liquid
Client Sample ID:	DW03	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
Carbon disulfide	ND	2.50	5.00	NA		µg/L	05/22/15 3:32PM		
Carbon tetrachloride	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Chlorobenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Chloroethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Chloroform	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Chloromethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
2-Chlorotoluene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
4-Chlorotoluene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Dibromochloromethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
DBCP	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,2-Dibromoethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Dibromomethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,2-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,3-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,4-Dichlorobenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Dichlorodifluoromethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,1-Dichloroethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,2-Dichloroethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,1-Dichloroethene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
cis-1,2-Dichloroethene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
trans-1,2-Dichloroethene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,2-Dichloropropane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,3-Dichloropropane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
2,2-Dichloropropane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,1-Dichloropropene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
cis-1,3-Dichloropropene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
trans-1,3-Dichloropropene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Ethylbenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Hexachlorobutadiene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
2-Hexanone	ND	5.00	10.0	NA		µg/L	05/22/15 3:32PM	PA/VA	
Iodomethane	ND	5.00	10.0	NA		µg/L	05/22/15 3:32PM	PA/VA	
Isopropylbenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
p-Isopropyltoluene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Methylene chloride	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
4-Methyl-2-pentanone	ND	5.00	10.0	NA		µg/L	05/22/15 3:32PM	PA/VA	
MTBE	ND	2.50	5.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Naphthalene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
n-Propylbenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Styrene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,1,1,2-Tetrachloroethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,1,2,2-Tetrachloroethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	

REI Consultants, Inc. - Analytical Report

WO#: 1505I24

Date Reported: 5/27/2015

Client:	GREENE ENVIRONMENTAL SERVICES, LLC	Collection Date:	5/12/2015 8:50:00 AM
Project:	FMMD1005	Date Received:	5/15/2015
Lab ID:	1505I24-01A	Matrix:	Liquid
Client Sample ID:	DW03	Site ID:	VIRGINIA

Analysis	Result	MDL	PQL	MCL	Qual	Units	Prep Date	Date Analyzed	NELAC
Tetrachloroethene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Toluene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,2,3-Trichlorobenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,2,4-Trichlorobenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,1,1-Trichloroethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,1,2-Trichloroethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Trichloroethene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Trichlorofluoromethane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,2,3-Trichloropropane	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,2,4-Trimethylbenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
1,3,5-Trimethylbenzene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Vinyl acetate	ND	5.00	10.0	NA		µg/L	05/22/15 3:32PM	PA/VA	
Vinyl chloride	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
o-Xylene	ND	0.500	1.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
m,p-Xylene	ND	1.00	2.00	NA		µg/L	05/22/15 3:32PM	PA/VA	
Surr: 1,2-Dichloroethane-d4	100	NA	68.7-129	NA		%REC	05/22/15 3:32PM		
Surr: 4-Bromofluorobenzene	104	NA	71.8-127	NA		%REC	05/22/15 3:32PM		
Surr: Dibromofluoromethane	106	NA	74.3-124	NA		%REC	05/22/15 3:32PM		
Surr: Toluene-d8	92.6	NA	71.4-129	NA		%REC	05/22/15 3:32PM		



Improving the environment, one client at a time...

REI Consultants, Inc.
PO Box 286
Beaver, WV 25813
TEL: (304)255-2500
Website: www.reiclabs.com

Sample Receipt Checklist

Client Name: GRE096 Work Order Number: 1505124
RCPNo: 1 Date and Time Received: 5/15/2015 10:07:23 AM Received by: Randy Rose
Completed By: Whitney Williams Reviewed By:
Completed Date: 5/15/2015 10:08:54 AM Reviewed Date:

Carrier Name: REIC

- 1. Chain of custody present? Yes [x] No []
2. Chain of custody signed when relinquished and received? Yes [x] No []
3. Are matrices correctly identified on Chain of custody? Yes [x] No []
4. Is it clear what analyses were requested? Yes [x] No []
5. Custody seals intact? Yes [] No [] Not Present [x]
6. Samples in proper container type and preservative? Yes [x] No []
7. Were correct preservatives noted on COC? Yes [x] No [] NA []
8. Sample containers intact? Yes [x] No []
9. Sufficient sample volume for indicated test? Yes [x] No []
10. Were container labels complete? Yes [x] No []
11. All samples received within holding time? Yes [x] No []
12. Was an attempt made to cool the samples? Yes [x] No [] NA []
13. Sample Temp. taken and recorded upon receipt? Yes [x] No [] To 2 °C
14. Water - Were bubbles absent in VOC vials? Yes [] No [] No Vials [x]
15. Are Samples considered acceptable? Yes [x] No []
16. COC filled out properly? Yes [x] No []

Client Notification/Response

Client Name: GRE096 Work Order Number: 1505124
Comment:
Client Contacted: Yes [] No [] NA [x] Person Contacted:
Contact Mode: Phone [] Fax: [] Email: [] In Person: []
Date Contacted: Contacted By:
Regarding:
Client Instructions:
Corrective Action:

APPENDIX E

Hydrocarbon Estimates

Residual Phase Estimate – Calculations Sheets & Associated Figures
Free Phase Product Estimate – Letter Report & Associated Figures – GES

CALCULATION SHEET

RESIDUAL PHASE MASS

As part of Corrective Action Plan activities, Greene calculated the estimated mass of residual hydrocarbon at the Meadows of Dan Food Market utilizing the soil sample analytical results collected during boring installation. The estimate is limited to the area within the current borehole array and is somewhat restricted by the limited number of soil samples collected from the borings. The estimate was calculated by separating the site into five foot thick vertical layers, calculating the average TPH-GRO concentrations for each layer, and finally calculating the mass estimate for each layer. Greene eliminated the soil sample results collected from the layers where free phase petroleum is present (25'-30') due to the majority of the petroleum mass in this layer having already been accounted for in the free phase mass estimate. A summary of the calculations utilized to determine the residual phase mass estimate is included below:

Soil Boring ID	Sample Depth Interval (ft) & Concentration (mg/kg)						
	0-5	5-10	10-15	15-20	20-25	25-30	30-35
B01	0	0	0	17.8	1,550	4,890	1,190
B02	0	0	22.9	799	479	6,000	1,830
B03	0	0	0	0	7.97	3,790	705
B07	4.0	0	0	0	0.105	6.14	0.252
B12	NA ¹	NA	0	0	0	0	1,110
B14	0	0	0	0	0	0	NA
B15	0	0	0	0	0	415	NA
B21	NA	NA	NA	0	0	0	1,420
B22	0	0	0	0	0	0	NA
B23	NA	NA	NA	0.294	1.68	677	NA
B24	NA	NA	NA	0	0	0	NA
B25	0	0.531	0	0	0	4,760	3.67
B26	NA	NA	NA	0.385	0.497	430	354
B28	NA	NA	NA	0	0	0	1,860
AVERAGE	0.5	0.066	2.5	58.4	145.7	1,497.7	941.4

¹NA = Not analyzed.

CALCULATION SHEET

RESIDUAL PHASE MASS

GIVEN:

Area of borehole array = ~6,382 ft²

1 ft³ = ~0.05555 tons

1 ton = ~907.185 kg

1 kg = ~2.2 lbs

Residual Phase Mass Estimate							
Layer (ft)	Volume (ft ³)	Volume (tons)	Volume (kg)	Average TPH-GRO Concentration (mg/kg)	Residual Phase Mass (mg)	Residual Phase Mass (kg)	Residual Phase Mass (lbs)
0-5	31,910	1,773	1,608,077	0.5	804,038	0.80	1.77
5-10	31,910	1,773	1,608,077	0.07	106,133	0.11	0.23
10-15	31,910	1,773	1,608,077	2.5	4,020,191	4.02	8.86
15-20	31,910	1,773	1,608,077	58.4	93,911,673	93.91	207.04
20-25	31,910	1,773	1,608,077	145.7	234,296,758	234.30	516.54
25-30	Due to the majority of the petroleum mass in this layer having already been accounted for in the free phase mass estimate the data was eliminated from the residual phase mass estimate.						
30-35	31,910	1,773	1,608,077	941.4	1,513,843,297	1,513.84	3,337.45
						Total Mass (lbs)	4,071.89



Environmental Informatics Group

1750 Kraft Drive, Suite 2700 • Blacksburg, Virginia 24060 • Tel - (866) 756-0788 • Fax – (866) 902-2187

M E M O R A N D U M

DATE: June 23, 2015
TO: Adam Flora, Trev Greene
FROM: Dave Bennett, Monika Lynch
RE: “Free Product” Volume Estimate for the Meadows of Dan Food Market

Modeling was conducted to determine the “Free Product” volume of petroleum resulting from underground tank failure at the Meadows of Dan Food Market located at 2609 Jeb Stuart Highway, Meadows of Dan, Virginia (“the site”). GES was contracted by Greene Environmental to perform the volume evaluation at the site. Specifically, the volume estimation utilized Product thickness measurements from observation wells made in November 2014 (**Figure 1**) along with product and soil characterization data from the site. The volume estimation was performed using the ARMOS (ES&T, 1996) program. Prior work at the site has been performed by Greene to investigate the groundwater, soil and product occurrences in the sub-surface. Site characterization data for the model evaluation was directly provided by Greene Environmental and from within the Site Characterization Report (SCR) (Greene, 2014).

Modeling Approach and Parameters

ARMOS is a finite element model for simulating flow of water and separated phase product/hydrocarbon (LNAPL) in an areal two-dimensional domain. It is capable of considering spatially variable aquifer properties and a variety of boundary conditions for both water and product, including withdrawal and recharge. ARMOS can determine in-place volume estimates using observed monitoring well data. Unlike models that assume a sharp oil-water interface in the soil (i.e. “pancake model”), ARMOS describes soil capillarity with a general model that is applicable to fine as well as coarse grained soils. Since linear conversion scheme cannot be employed to accurately relate the height of product in a monitoring well to the product volume in porous media, ARMOS uses capillary functions that consider the effects of grain-size distribution and product properties to determine the corresponding soil saturation profile. ARMOS employs a model based on the three-phase van Genuchten capillary function (Parker et al., 1987; Parker and Lenhard, 1989; Lenhard and Parker, 1990), which is simple and accurate. Parametric values are also widely tabulated and available for a broad range of soils.

For free-phase volume estimates, product thicknesses are defined on the finite element grid constructed for the site at each node based on contoured product thicknesses. Calculations are performed at each node to determine the resulting specific volume of free product from computed oil saturation profiles per unit area (representing the area encompassing that node), and the nodal volumes are then summed across the site for a total volume.

Setup of the model for the site involved the construction of a finite element mesh consisting of 12,221 nodes and 12,000 elements with a 2.5-foot spacing that encompassed the product plume. In the modeling

effort, input parameter values were defined from site data whenever possible. When site-specific data were not available, literature values are typically utilized to define model input values.

A hydraulic conductivity of 0.4049 ft/d was applied in the model as determined by the March 2014 pump test presented in the SCR. Other soil properties required by ARMOS including porosity, maximum residual product saturations in the vadose and phreatic zone, and the maximum water relative permeability were taken from literature values (Carsel and Parrish, 1988; Weaver et al., 1994) corresponding to the silty fine sands encountered at the site. The following describes the input parameters of the model and the values applied in the modeling effort.

Table 1. Soil Properties Applied in the Modeling Analysis.

Soil	Saturated Hydraulic Conductivity (feet/day)	Porosity (%)	Irreducible Water Saturation	van Genuchten alpha (1/feet)	van Genuchten n	Maximum Residual Oil Saturation	
						Vadose Zone	Phreatic Zone
Loamy Sand	0.4049	30	0.21	3.8	2.4	0.0498	0.2370

Porosity – Total porosity is the ratio of void volume to total volume in the aquifer. A porosity value of 0.30 was utilized in the modeling effort consistent with the pump-down test from the SCR.

Hydraulic Conductivity – A pump test assessment was conducted in March 2014, and a hydraulic conductivity of 0.4049 ft/d was applied in the model.

Free product properties defined in the analysis included LNAPL density, viscosity, and surface tension. Product collected from the site was analyzed by SPL, Inc. and was determined to be gasoline. A combination of data determined from Laboratory analysis and literature values were used in the model to characterize the product.

Table 2. Product Properties Applied in the Modeling Analysis.

Product Type	Specific Gravity	Dynamic Viscosity (cp)	Air-Oil Surface Tension Factor	Oil-water Surface Tension Factor
Gasoline	0.7439	0.62	3.3	1.4

Source: ES&T (1996).

Product Specific Gravity – A value of 0.7439 grams/centimeter³ determined from Laboratory analysis was applied in the model.

Dynamic Viscosity – A value of 0.62 centipoise corresponding to a gasoline was applied in the model.

Fluid Scaling Factors – Air-oil and oil-water scaling factors are necessary to describe three phase saturation-capillary pressure relations (ES&T, 1996). Values of 3.3 and 1.4 corresponding to a gasoline were applied, respectively.

Product thickness – Product thickness measurements taken on November 5, 2014 were used in the estimate. **Table 3** presents the individual product thickness measurements at the monitoring wells, and **Figure 1** depicts the corresponding contour map.

Table 3. Summary of Free Product Thicknesses

Well Identification	11/05/14 Free Product Thickness (feet)
MW01A	2.79
MW02	3.30
MW03	3.00
MW04	0.00
MW05	0.00
MW06	0.00
MW07	0.00
MW08	0.00
MW09	0.00
MW10	0.00
MW11	0.00
MW12	0.26
MW13	0.00
MW14	2.66
MW15	2.43
MW16	0.00
MW17	0.00
MW18	0.00
MW19	0.41
MW20	0.00
MW21	2.57
MW22	2.24
MW23	1.64
MW24	0.06
MW25	0.10
MW26	3.87
MW27	0.00
MW28	2.37

Model Results

ARMOS modeling results using the input as described above estimate that approximately 13,263 gallons of free product were present at the site during the November 2014 gauging event. The result of the volume calculation represents the separate-phase (i.e. liquid; not dissolved) product and is based on

measured thicknesses observed in the monitoring wells. The estimate does not consider PSH volume present as residual in the soil both in the vadose and phreatic zones that is not observable in a monitoring well. In addition, the model results do not indicate that amount of product is “recoverable” by mechanical means, but that amount is what is currently observable by the monitoring well network.

The estimated volume should be considered to be representative for comparative purposes, but is not intended to represent an exact number. It should be noted that a degree of uncertainty is present within the model input values that are taken from literature values. Although these values are considered representative of what is encountered at the site, specific measurements were not made in most cases.

REFERENCES

Carsel, R.F. and R.S. Parrish. 1988. Developing joint probability distributions of soil water retention characteristics, *Water Resources Research*, 24(5): 755-769.

ES&T, 1996. *ARMOS User Guide: Areal Multiphase Organic Simulator for Free Phase Hydrocarbon Migration and Recovery*, Environmental Systems & Technologies, Inc., Blacksburg, VA.

van Genuchten, M.Th., F.J. Leil, and S.R. Yates. 1991. *The RETC Code for Quantifying the Hydraulic Functions of Unsaturated Soils*, EPA/600/2-91/065. Robert S. Kerr Environmental Research Laboratory, Office of Research and Development, United States Environmental Protection Agency, Ada, Oklahoma.

Greene, 2014. Site Characterization Report - Meadows of Dan Food Market 2609 Jeb Stuart Highway Meadows of Dan, Virginia, PC# 2014-2256, Greene Project# FMMD1002. April 18, 2014

Parker, J. C. and R. J. Lenhard, T. Kuppusamy, 1987. A Parametric Model for Constitutive Properties Governing Multiphase Flow in Porous Media, *Water Resources Research* 23, 618-624.

Parker, J. C. and R. J. Lenhard, 1989, Vertical integration of three-phase flow equations for analysis of light hydrocarbon plume movement. *Transport in Porous Media*, 5, 87-206. (M8808).

Lenhard, R. J. and J. C. Parker, 1990, Estimation of free hydrocarbon volume from fluid levels in monitoring wells. *Ground Water*, 28, 57-67. (M8811).

Weaver, J.W., R.J. Charbeneau, J.D. Tauxe, B.K. Lien, and J.B. Provost. 1994. *The Hydrocarbon Spill Screening Model (HSSM), Volume 1: User's Guide*, EPA/600/R-94/039a. Robert S. Kerr Environmental Research Laboratory, Office of Research and Development, United States Environmental Protection Agency, Ada, Oklahoma.



LEGEND

- MW10 MONITORING WELL
- 1.64 MEASURED LNAPL THICKNESS (ft)

DRAWN BY:
JCW
CHECKED BY:
DRB
REVIEWED BY:

LNAPL DISTRIBUTION ON 11/05/2014

T&M, M OF D, LLC
MEADOWS OF DAN FOOD MARKET
MEADOWS OF DAN, VA



GROUNDWATER & ENVIRONMENTAL SERVICES, INC.
1750 KRAFT DRIVE, SUITE 2700, BLACKSBURG, VA 24060

SCALE IN FEET



DATE

5-27-2015

FIGURE

1

APPENDIX F

Recovery Estimate Calculations

Recovery Calculation Sheets
Petroleum Mass Graph

CALCULATION SHEET

DPE Recovery Rate and Period

PROBLEM:

Determine petroleum rate of recovery based on data collected during Dual Phase Extraction Pilot Study and determine length of long term DPE application based on recovery rate.

GIVEN:

Petroleum Mass Prior to Pilot Study = 86,303
Petroleum Mass Recovered During Pilot Study = 4,605
Petroleum Mass Estimate After Pilot Study = 81,698
Petroleum Mass Recovered During Multiple Well Phase = 2,302
Days of Operation During Multiple Well Phase = 5.92

SOLUTION:

Using the site-specific information collected during the multiple well phase of the pilot study, a daily recovery rate of total petroleum has been calculated. It should be noted that the given information consists of estimates and approximations. Further, Greene estimated a 50% increase in recovery rate due to the size of the proposed remediation system as compared to the one utilized for the pilot study.

Determine Daily Recovery Mass:

$$\begin{aligned}\text{Daily Recovery Mass} &= \text{Multiple Well Phase Mass Recovery} / \text{Days of Multiple Well Phase Operation} \\ &= 2,302 \text{ lbs} / 5.92 \text{ days} \\ &= 389.070 \text{ lbs/day OR } 583.606 \text{ lbs/day (50\% increase estimation)} \\ &\approx 389 \text{ lbs/day OR } 584 \text{ lbs/day (50\% increase estimation)}\end{aligned}$$

Convert Daily Recovery Mass to Daily Recovery Rate:

$$\begin{aligned}\text{Daily Recovery Rate} &= \text{Daily Recovery Mass} / \text{Petroleum Mass Prior to Pilot Study} \\ &= 584 \text{ lbs/day} / 86,303 \text{ lbs} \\ &= 0.0068 / \text{day} \\ &= 0.68\%\end{aligned}$$

CALCULATION SHEET

DPE Recovery Rate and Period

Several factors affect the recovery potential and rate of DPE when applied to subsurface petroleum contaminants. However, recovery trends are expected to reduce the petroleum mass in such a way that the operation may be modeled as exponential decay.

Exponential decay is expressed as $Y = ne^{kt}$ or $k = \frac{\ln(\frac{y}{n})}{t}$ or $t = \frac{\ln(\frac{y}{n})}{k}$

Where: Y=Final Mass
n=Initial Mass
e =2.71828 (Euler's Number)
k =Decay Constant
t =Time Period

In order to determine the length of time needed to reduce the current petroleum mass to fractions of itself, one must first determine the Decay Constant, k. By applying the calculated Daily Recovery Rate of 0.68% to calculate the final mass after one day of application, k can be calculated:

$$k = \frac{\ln(\frac{y}{n})}{t} \quad \left| \quad k = \frac{\ln(\frac{81,142.45}{81,698})}{1} \quad \right| \quad k = -0.006823$$

Now that k is known, we can solve for t, time period (in days) to reduce the initial mass to ½ and ¼ of itself. This is an asymptotic recovery model so removing all of the initial mass is assumed to not be possible.

½ of initial mass:

$$t = \frac{\ln(\frac{y}{n})}{k} \quad \left| \quad t = \frac{\ln(40,849/81,698)}{-0.006823} \quad \right| \quad t \approx 102 \text{ days}$$

¼ of initial mass:

$$t = \frac{\ln(\frac{y}{n})}{k} \quad \left| \quad t = \frac{\ln(20,424/81,698)}{-0.006823} \quad \right| \quad t \approx 203 \text{ days}$$

CALCULATION SHEET

DPE Recovery Rate and Period

It is expected that the recovery rate will drop to a fraction of itself within the first several weeks of long term DPE implementation. For the purposes of estimating a reasonable remediation time period, decay constants of -0.003412 and -0.001706 have been calculated based on $\frac{1}{2}$ of the calculated daily recovery rate (0.3412%) and $\frac{1}{4}$ of the calculated daily recovery rate (0.1706%). These decay constants have been applied to the estimated remaining petroleum mass as shown below. Again, recovery is expected to be asymptotic, so removing all of the initial mass is not possible.

K= -0.003412

$\frac{1}{2}$ of initial mass:

$$t = \frac{\ln\left(\frac{y}{n}\right)}{k} \quad \left| \quad t = \frac{\ln(40,849/81,698)}{-0.003412} \quad \right| \quad t \approx 203 \text{ days}$$

$\frac{1}{4}$ of initial mass:

$$t = \frac{\ln\left(\frac{y}{n}\right)}{k} \quad \left| \quad t = \frac{\ln(20,425/81,698)}{-0.003412} \quad \right| \quad t \approx 406 \text{ days}$$

K= -0.001706

$\frac{1}{2}$ of initial mass:

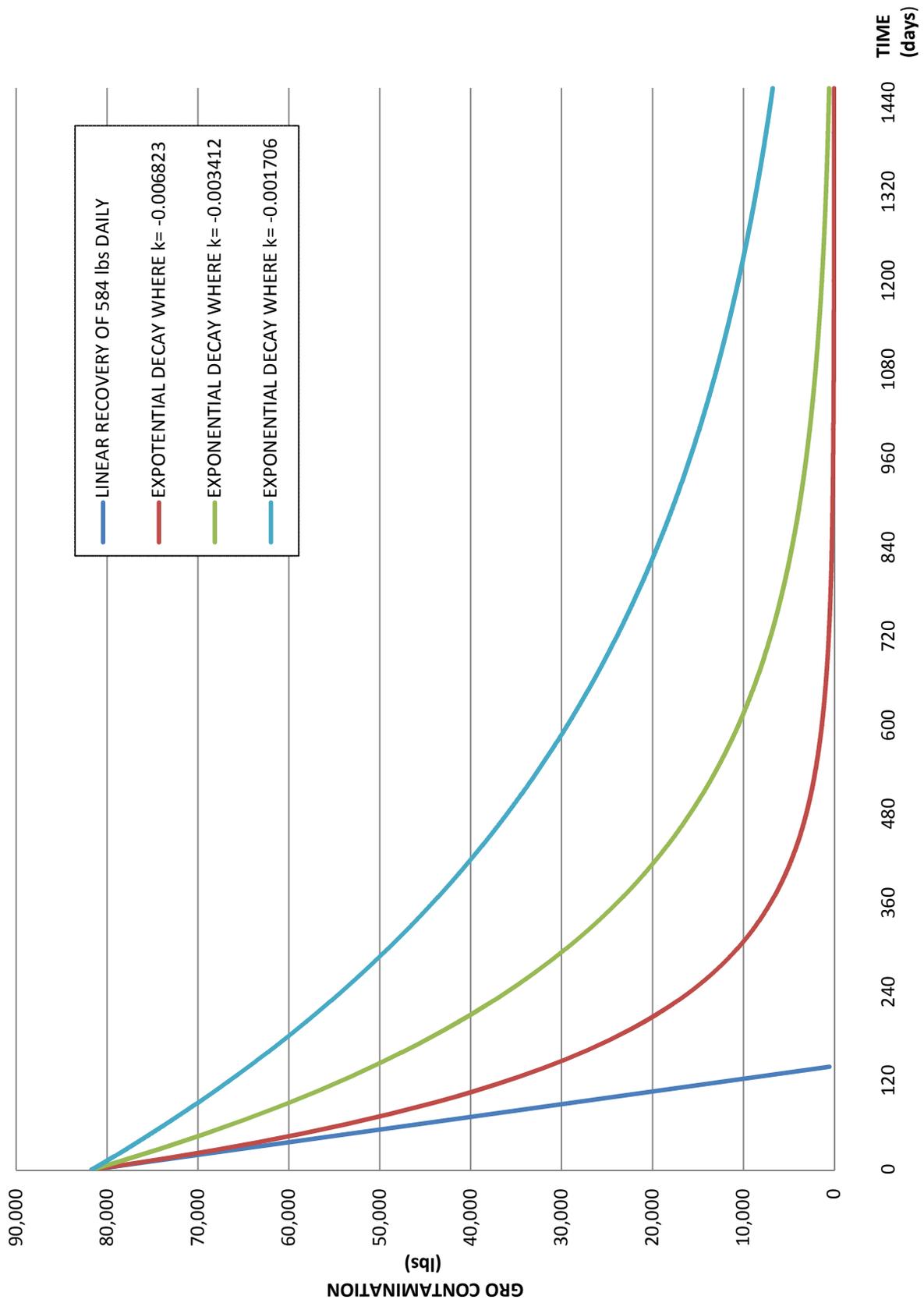
$$t = \frac{\ln\left(\frac{y}{n}\right)}{k} \quad \left| \quad t = \frac{\ln(40,849/81,698)}{-0.001706} \quad \right| \quad t \approx 406 \text{ days}$$

$\frac{1}{4}$ of initial mass:

$$t = \frac{\ln\left(\frac{y}{n}\right)}{k} \quad \left| \quad t = \frac{\ln(20,425/81,698)}{-0.001706} \quad \right| \quad t \approx 813 \text{ days}$$

PETROLEUM MASS GRAPH

MEADOWS OF DAN FOOD MARKET-FMMD1005



APPENDIX G

General VPDES Permit VAG83

VPDES General Permit Registration Statement (VAG83)
VA DEQ Coverage Letter Dated June 2, 2015
Blank VA DEQ Discharge Monitoring Report

**VPDES GENERAL PERMIT REGISTRATION STATEMENT
FOR DISCHARGES FROM PETROLEUM CONTAMINATED SITES,
GROUNDWATER REMEDIATION AND HYDROSTATIC TESTS (VAG83)**

Please Type or Print All Information

1. Legal Name of Facility Meadows of Dan Food Market
2. Facility Address or Location 2609 Jeb Stuart Highway
City Meadows of Dan State Virginia Zip 24120
Phone (276) 952-2934 Email Address _____
3. Facility Owner Name T&M Southwest, LLC
Owner Address P.O. Box 709
City Riner State Virginia Zip 24149
Phone (540) 381-5177 Email Address _____
4. Nature of the business conducted at the facility Retail petroleum station and convenience store
5. Type of petroleum or natural gas products, or chlorinated hydrocarbon solvents causing or that caused the contamination Gasoline
6. Which activities will result in a point source discharge from the site? (**Check all that apply - See Instructions**)
 Aquifer Tests to Characterize Site Conditions
 Pumping Contaminated Groundwater to Remove Free Product From The Ground
 Other Petroleum Product or Chlorinated Hydrocarbon Solvent Cleanup Activity
(specify the activities) _____
7. Has a site characterization report for this site been submitted to the Department of Environmental Quality?
Yes No _____ N/A _____
8. Characterize or describe the wastewater to be discharged including the types of contaminants present in the wastewater (**Please attach analytical data**) Gasoline impacted groundwater will be recovered during remediation activities. The influent water will include gasoline constituents consisting of, but not limited to, benzene, toluene, ethylbenzene, xylenes, MTBE, and naphthalene. Table 1 (attached) is a summary of the pilot study influent sample results.
9. Identify the discharge point and the waterbody into which the discharge will occur. For linear projects, identify the location of all the proposed discharge points along the project length and the associated waterbody for each discharge point (**Attach additional sheets if necessary**) The treated effluent will discharge into a vegetated ditch located north-northwest of the property. The vegetated ditch drains to an unnamed intermittent tributary to Tuggle Creek.
10. How often will the discharge occur (e.g., daily, monthly, continuously)? Continuously (every 30-60 minutes)
11. Estimate how long each discharge will last: 4 hrs/day hours or days ***Assumes 2 estimated 5 minute discharges/hour**
12. Estimate total volume of wastewater to be discharged: 730,000 Gal. ***Annually**

13. Estimate maximum flow rate of the discharge: 2,000 Gal/day.
14. Attach a diagram of the proposed wastewater treatment system identifying the individual treatment units.
15. Attach a USGS 7.5 minute topographic map or equivalent computer generated map which indicates the receiving waterbody name(s), the discharge point(s), the property boundaries, as well as springs, other surface waterbodies, drinking water wells, and public water supplies, which are identified in the public record or are otherwise known to the applicant, within a 1/2 mile radius of the proposed discharge(s).

16. Will the facility discharge to a municipal separate storm sewer system (MS4)? Yes _____ No X

If "Yes", list the name of the MS4 owner (*see instructions*) _____

17. Are central wastewater treatment facilities available to this site? Yes _____ No X

If "Yes", has the option of discharging to the central facilities been evaluated? Yes _____ No _____

If "Yes", what was the result of that evaluation? _____

18. Does this facility currently have a permit issued by the Board? Yes _____ No X

If "Yes", please provide permit number: _____

19. Pollution Complaint Number(s) (if applicable) PC# 2014-2256

20. Is the material being treated or discharged classified as a hazardous waste under the Virginia Hazardous Waste Regulation, 9 VAC 20-60? Yes _____ No X

21. Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations. I do also hereby grant duly authorized agents of the Department of Environmental Quality, upon presentation of credentials, permission to enter the property for the purpose of determining the suitability of the general permit.

Signature: _____ Date: May 26, 2015

Print Name: Marshall Adam Flora

Title: Project Manager, Greene Environmental Services, LLC

REQUIRED ATTACHMENTS

- Wastewater Characterization Analytical Data
- Treatment Works Design Schematic Drawing
- Topographic or Computer Generated Map

For Department Use Only:

Waterbody _____

Basin _____ Stream Class _____ Section _____

Special Standards _____

SECTION 8

Table 1.
A Summary of the Meadows of Dan Pilot Study Dissolved Phase Analytical Results

Sample ID	Date	TPH-GRO ¹	TPH-DRO ²	Benzene ³	Toluene	Ethyl-benzene	Xylenes	MTBE	Naphthalene
INF ⁴ -1	11/20/14	193,000	47,700	3,130	33,300	6,860	34,100	12,900	1,140
INF-2	11/21/14	174,000	76,900	1,850	24,500	5,750	31,700	9,260	1,440
INF-3	11/21/14	164,000	43,800	1,570	21,600	5,470	30,600	8,600	1,570
INF-4	11/22/14	152,000	79,100	1,400	17,500	4,720	27,600	7,660	2,240
INF-5	11/23/14	120,000	187,000	1,250	14,800	3,450	20,400	7,500	2,300
INF-6	11/24/14	107,000	71,600	1,150	13,200	2,980	18,100	6,720	2,360
INF-7	11/25/14	94,700	50,100	1,040	12,200	2,840	16,900	6,120	2,340
INF-8	11/26/14	88,700	50,300	992	11,800	2,710	15,900	5,840	2,080

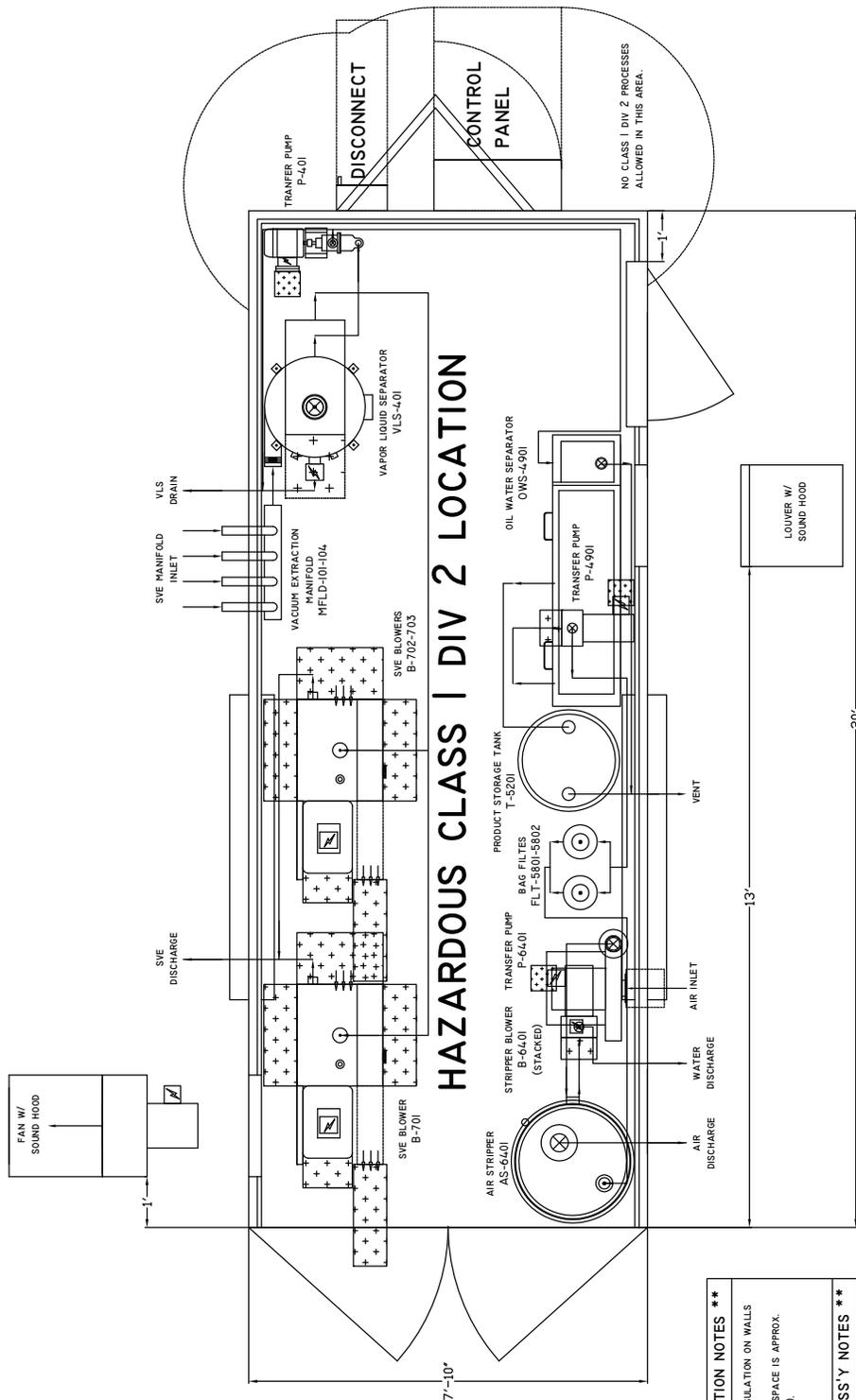
¹TPH (gasoline range organics) analysis via U.S. EPA SW-846 method 8015B; reported in micrograms per liter (µg/L).

²TPH (diesel range organics) analysis via U.S. EPA SW-846 method 8015B; reported in µg/L.

³BTEX, MTBE, naphthalene analysis via U.S. EPA SW-846 method 8021B; reported in µg/L.

⁴INF = Influent samples collected from the piping transferring water from the oil/water separator to the air stripper.

SCALE BAR, EACH BLOCK IS 12" LONG



This information is the property of MAE and cannot be reused or reproduced without the written consent of Mid Atlantic Environmental.

- ** CIVIL CONSTRUCTION NOTES ****
 - 1" SOUND ATTENUATING INSULATION ON WALLS AND CEILING
 - INTERIOR FINISHED WORK SPACE IS APPROX. 19' 8" X 7' 4" (AS SHOWN).
- **MECH./ELECT. ASS'Y NOTES ****
 - LOCATE COOLING THERMOSTAT IN THE WARMEST LOCATION AT CEILING LEVEL.
 - VIBRATION ISOLATORS UNDER EQUIPMENT.
 - MAXIMUM WIDTH FOR SHIPPING IS 102". THIS INCLUDES ALL CONNECTIONS THAT PROTRUDE THROUGH THE SIDES OF THE ENCLOSURE.
 - MOUNT BAG FILTERS TO TRAILER WALL.
- *** COMMISSIONING NOTES *****
 - FAN AND LOUVER HOODS NEED TO BE INSTALLED ON SITE. CANNOT SHIP WITH HOODS ATTACHED.
- *** DIMENSION INFORMATION *****

SYSTEM POSITION DESIGNATION

- 100 - VACUUM INLET MANIFOLD
- 300 - INLET HEAT EXCHANGER
- 400 - VAPOR/LIQUID SEPARATOR
- 500 - VAPOR/LIQUID SEPARATOR - 2
- 700 - SOLID-VAPOR EXTRACTION
- 1000 - LIQUID-RING PUMPS
- 1500 - LIQUID-RING PUMPS
- 1600 - VAPOR-PHASE CARBON
- 1900 - OXIDIZER
- 2200 - AIR SPARGE
- 2500 - SPARGE HEAT EXCHANGER
- 2800 - SPARGE OUTLET MANIFOLD
- 3000 - AIR COMPRESSOR
- 3400 - COMPRESSED-AIR OUTLET MANIFOLD
- 3700 - PNEUMATIC WELL PUMPS
- 4000 - SURFACE-MOUNT WELL PUMPS
- 4300 - SURFACE-MOUNT WELL PUMPS
- 4600 - GROUNDWATER INLET MANIFOLD
- 4900 - OIL/WATER SEPARATOR
- 5200 - PRODUCT STORAGE TANK
- 5500 - INLET TANK
- 5800 - UPSTREAM BAG FILTER
- 6000 - CHEMICAL INJECTION
- 6400 - AIR STRIPPER
- 6700 - UPSTREAM BAG FILTER
- 7000 - LIQUID-PHASE CARBON
- 7100 - PRE-MEDIA BAG FILTER
- 7200 - ACTIVATED ALUMINA
- 7300 - DISCHARGE TANK
- 7400 - POST-TREATMENT BAG FILTER
- 7600 - REINJECTION
- 7900 - BUILDING-TRAILER OR SKID
- 8200 - CONTROL PANEL
- 8300 - ELECTRICAL PARTS
- 9900 - EXTRAS

INSTRUMENT DESIGNATION

INPUT	1ST MODIFIER	2ND MODIFIER	3RD MODIFIER	OUTPUT	1ST MODIFIER
A					A
B					B
C					C
D					D
E					E
F					F
G					G
H					H
I					I
J					J
K					K
L					L
M					M
N					N
O					O
P					P
Q					Q
R					R
S					S
T					T
U					U
V					V
W					W
X					X
Y					Y
Z					Z

INSTRUMENT IDENTIFICATION

- INDICATING INSTRUMENT
- DIGITAL INPUT TO CONTROL PANEL
- DIGITAL INPUT CAUSING ALARM
- DIGITAL INPUT CAUSING SYSTEM SHUTDOWN ALARM
- ANALOG INPUT TO CONTROL PANEL
- ANALOG OUTPUT FROM CONTROL PANEL

EXAMPLE



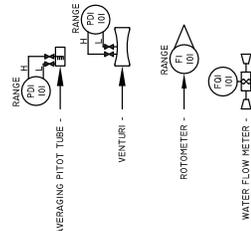
EQUIPMENT

- CENTRIFUGAL PUMP -
- PROGRESSIVE-CAVITY PUMP -
- CHEMICAL-INJECTION PUMP -
- CENTRIFUGAL REGENERATIVE BLOWER -
- POSITIVE-DISPLACEMENT BLOWER -
- ROTARY-CLAW BLOWER -
- LIQUID-RING PUMP -
- ROTARY-VANE COMPRESSOR -
- RECIPROCATING COMPRESSOR -
- HEAT EXCHANGER -
- PASSIVE COOLING FINN -

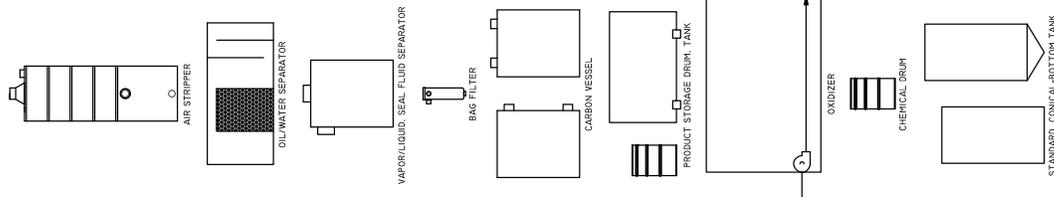
EQUIPMENT

- AS - AIR STRIPPER
- BS - BUILDING-TRAILER OR SKID
- FL - FILTER VESSEL
- LPC - LIQUID-PHASE CARBON VESSEL
- MPD - MANIFOLD
- OX - OXIDIZER
- PST - PRODUCT STORAGE TANK
- SP - SEALED WATER SEPARATOR
- SMS - SEAL WATER SEPARATOR
- TMK - TANK
- WLS - VAPOR/LIQUID SEPARATOR
- WPC - VAPOR-PHASE CARBON VESSEL

FLOW MEASUREMENT



EQUIPMENT

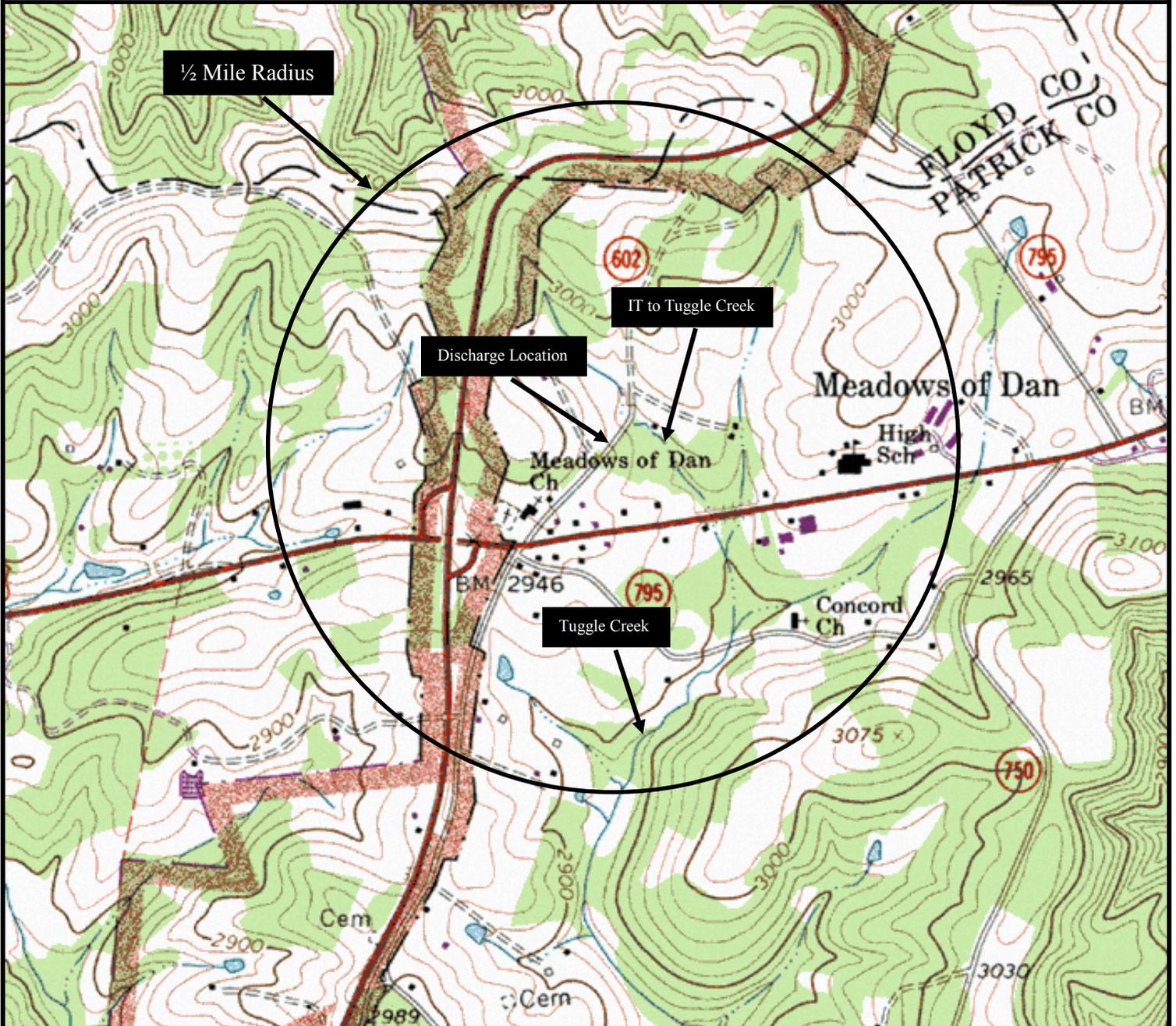


VALVES AND PIPING

- BALL VALVE -
- GATE VALVE -
- GLOBE VALVE -
- NEEDLE VALVE -
- SLIDE VALVE -
- SOLENOID VALVE -
- BUTTERFLY VALVE -
- SWING CHECK VALVE -
- WATER CHECK VALVE -
- SPRING CHECK VALVE -
- WYE STRAINER -
- SAMPLE PORT -
- PRESSURE RELIEF VALVE -
- VACUUM RELIEF VALVE -
- CAMLOCK CONNECTION -
- FERSCO CONNECTION -
- FLEXIBLE CONNECTION -
- FLANGED CONNECTION -
- REDUCER -
- UNION -
- ABSORBENT FILTER -
- COALESCING FILTER -
- PARTICULATE FILTER -
- FILTER SILENCER -
- PRESSURE REGULATOR -
- REGULATOR W/ FILTER -

SECTION 15: 1/2 Mile Radius Topographic Map

Meadows of Dan Food Market
2609 Jeb Stuart Highway
Meadows of Dan, Virginia 24120



ENVIRONMENTAL SERVICES LLC
200 Buckwheat Lane, Rocky Mount, Virginia 24151

Office: 540-483-3311 or 800-215-2596
Fax: 540-483-3381

www.greene-environmental.com

MEADOWS of DAN, VIRGINIA

Source: U.S.G.S. Topographic Map of the Meadows of Dan Quadrangle, Virginia, 7.5 Minute Series (1968, revised 1985)

Scale: Not to Scale Contour Interval: 20 Feet
Vertical Datum: National Geodetic Vertical Datum 1929

Horizontal Datum: North American Datum 1927

Project: VPDES Application

Client: T&M, M of D, L.L.C.

Greene Job #: FMMD1005

Date: May 14, 2015



Latitude: 036.7353972° N
Longitude: 080.4077838° W

SECTION 15: ¼ Mile Radius Potential Receptors Location Map

Meadows of Dan Food Market
 2609 Jeb Stuart Highway
 Meadows of Dan, Virginia 24120



GREENE
 ENVIRONMENTAL SERVICES LLC.

200 Buckwheat Lane, Rocky Mount, Virginia 24151

Office: 540-483-3311 or 800-215-2596

Fax: 540-483-3381

www.greene-environmental.com

**PATRICK COUNTY,
 VIRGINIA**

Source: Google Earth

Scale: Not to Scale

Project: VPDES Application

Client: T&M, M of D, L.L.C.

Greene Job #: FMMD1005

Date: May 14, 2015



Latitude:
 036.7353972° N
 Longitude:
 080.4077838° W

SECTION 15

**Table 2.
A Summary of the ¼-Mile Radius Receptor Survey Results**

Receptor ID	Name/Address¹	Well/Spring Location From UST System	Potential Receptor Information, Current Use, Installation Date, & Construction Details
DW01	Meadows of Dan Food Market 2609 Jeb Stuart Highway	~75 feet Northwest	Property maintains a drilled supply well with steel casing located within the store building. The date of installation and additional construction details are unknown.
DW02	Poor Farmer's Market 2616 Jeb Stuart Highway	~135 feet South	Property maintains a drilled supply well with steel casing located within the store building. The well was reportedly installed in 1962. Additional construction details are unknown. A residence is also located on the property, which obtains potable water from the same onsite supply well.
DW03	Jane's County Café 2588 Jeb Stuart Highway	~255 feet Southwest	Property maintains a drilled supply well with steel casing located within a well house behind the café. The date of installation and additional construction details are unknown.
DW04	Commercial Property 2554 Jeb Stuart Highway	~375 feet Southwest	A drilled supply well is located beneath the wooden porch at the DW04 property. The drilled supply well reportedly provides potable water to the properties identified as DW04, DW05, and DW06. The date of installation and additional construction details are unknown.
DW05	Commercial Property (For Sale) Formerly Dan River Books 36 Concord Road		
DW06	Commercial Property (Seasonal) 10 Concord Road		
DW07	Mountain Meadow Farm & Craft (seasonal) 12134 Squirrel Spur Road	~1,210 feet Southwest	A spring/spring house is located on the DW08 property. The spring reportedly provides potable water to both the DW07 and DW08 properties.
DW08	Greenberry House Yarn 12206 Squirrel Spur Road	~730 feet Southwest	
DW09	Burnette Residence 282 Concord Road	~1,300 feet Southeast	Property maintains a spring/spring house that reportedly provides potable water to the property.
DW10	Meadows of Dan Community Center 2858 Jeb Stuart Highway	~1,350 feet East-Southeast	Property maintains a drilled supply well located within the Meadows of Dan Community Center building. The date of installation and construction details are unknown.
DW11	Agee Residence 2883 Jeb Stuart Highway	~1,415 feet East-Northeast	Property maintains a drilled supply well with PVC casing located on the east side of the residence. The date of installation and additional construction details are unknown.

Table 2 (Cont'd).
A Summary of the ¼-Mile Radius Receptor Survey Results

Receptor ID	Name/Address¹	Well/Spring Location From UST System	Potential Receptor Information, Current Use, Installation Date, & Construction Details
DW12	Spangler Residence 2734 Jeb Stuart Highway	~630 feet East-Southeast	Property reportedly maintains a drilled supply well located on the south side of the residence. The supply well casing is reportedly buried and its exact location is unknown. The date of installation and additional construction details are unknown.
DW13	Stanley Residence 2727 Jeb Stuart Highway	~550 feet East-Northeast	Property maintains a drilled supply well with steel casing located on the south side of the residence. The supply well is reportedly 340 feet deep; however, the date of installation and additional construction details are unknown.
DW14	Private Residence 2685 Jeb Stuart Highway	~325 feet East	Property maintains a drilled supply well with PVC casing located on the south side of the residence. The supply well was reportedly installed in ~2008-2009. Additional construction details are unknown.
DW15	Nancy's Candy Company 2684 Jeb Stuart Highway	~470 feet Southeast	Property maintains a drilled supply well with steel casing located on the south side of the building. The supply well was installed in 1998 to approximately 405 feet below the ground surface. In addition, 105 feet of steel casing was installed and the well was grouted from 0-50 feet.
DW16	Commercial Property Former Mountain House Restaurant 2639 Jeb Stuart Highway	~175 feet East	Property maintains a drilled supply well with steel casing located within a well house on the east side of the property. The supply well was reportedly installed in 1982 to approximately 280 feet below the ground surface. Additional construction details are unknown.
DW17	Commercial Building (Multiple Businesses) 2577 Jeb Stuart Highway Meadows Merchant Building LLC	~200 feet Northwest	Property maintains a drilled supply well with steel casing located on the north side of the property. The top of casing is located below the ground within larger concrete casing. The date of installation and additional construction details are unknown.
DW18	Meadows of Dan Baptist Church 2511 Jeb Stuart Highway	~400 feet Northwest	Property maintains a drilled supply well with steel casing located within the parsonage. The date of installation and additional construction details are unknown.
DW19	Century Link Property 2646 Jeb Stuart Highway	~190 feet Southeast	Property maintains a drilled supply well located on the north side of the property. The top of casing is located below the ground within a manway. The date of installation and additional construction details are unknown.
DW20	Pond	~1,130 feet Southwest	The pond is located on the DW07 property and drains to an intermittent tributary to Tuggle Creek.
DW21	Unnamed Tributary	~950 feet East	Unnamed intermittent tributary to Tuggle Creek.
DW22	Unnamed Tributary	~1,030 feet Southwest	Unnamed intermittent tributary to Tuggle Creek.

¹Addresses are located in Meadows of Dan, VA 24120



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Blue Ridge Regional Office

www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Robert J. Weld
Regional Director

Lynchburg Office

7705 Timberlake Road
Lynchburg, Virginia 24502
(434) 582-5120
Fax (434) 582-5125

Roanoke Office

3019 Peters Creek Road
Roanoke, Virginia 24019
(540) 562-6700
Fax (540) 562-6725

June 2, 2015

Mr. Marshall Adam Flora
Project Manager
Greene Environmental Services, LLC
129 Bunny Ridge Lane
Rocky Mount, VA 24151

RE: Coverage under the General VPDES Permit for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests, VAG830483, Meadows of Dan Food Market, 2609 Jeb Stuart Highway, Meadows of Dan, PC 2014-2256

Dear Mr. Flora;

We have reviewed your Registration Statement received on May 26, 2015, and determined that the discharge outlined on that statement is hereby covered under the referenced general VPDES permit. The effective date of your coverage under this general permit is the date of this letter. The enclosed copy of the general permit contains the applicable effluent limitations, monitoring requirements and other conditions of coverage.

The permit requires effluent sampling on a monthly basis and reporting on a monthly basis. Discharge Monitoring Reports (DMRs) that you may use to report sampling results are enclosed. You are responsible for making additional copies of the DMR as needed. Separate DMRs must be completed for each permitted outfall and DMRs must be submitted for each outfall regardless of whether a discharge from that outfall occurred during the previous month. If a discharge did not occur from a particular outfall during the previous month, please write "no discharge" on the DMR. You are required to submit completed DMRs by the 10th of each month to:

Cathy Kibler
VA DEQ
3019 Peters Creek Road
Roanoke, VA 24019

Information provided on the registration statement indicates that wastewater will be discharged through a treatment works. Within 30 days of the date of this letter, you are required to develop and maintain on site an Operation and Maintenance (O&M) Manual for this permitted treatment works (see Part I.B.3 of the Permit).

Page 2

This general permit will expire on February 28, 2018. The conditions of the permit require that you submit a new registration statement no later than 30 days prior to the date of permit expiration if you wish to continue coverage under the permit.

If you wish to terminate permit coverage for inactive outfalls or the entire site, please fill out the enclosed Termination of Coverage Request form and send it to Lewis Pillis at the address for the Roanoke office listed above.

Please review the enclosed materials carefully. If you have any questions, please contact Lewis Pillis at lewis.pillis@deq.virginia.gov or at 540-562-6789.

Sincerely,

A handwritten signature in black ink that reads "Kip D. Foster". The signature is written in a cursive style with a large initial "K".

Kip D. Foster
Water Permit Manager

Enclosures:

Discharge Monitoring Report
VPDES Permit No. VAG830483
Termination of Coverage Request form

cc: Lewis Pillis, DEQ, BRRO-R (electronic)
Doug Carl, DEQ, BRRO-R (electronic)

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
 PETROLEUM DISCHARGE PERMIT
 DISCHARGE MONITORING REPORT(DMR)

PERMITTEE NAME/ADDRESS(INCLUDE
 FACILITY NAME/LOCATION IF DIFFERENT)
 NAME Meadows Of Dan Food Mart
 ADDRESS Meadows Of Dan Food Mart
 2609 JEB Stuart Hwy
 Meadows Of Dan VA 24120

VAG830483
 PERMIT NUMBER
 001
 DISCHARGE NUMBER

MONITORING PERIOD
 YEAR MO DAY TO
 YEAR MO DAY

NOTE: READ PERMIT AND GENERAL INSTRUCTIONS
 BEFORE COMPLETING THIS FORM

PARAMETER	QUANTITY OR LOADING		QUALITY OR CONCENTRATION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
	AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE			
001 FLOW	REPORTED *****			*****	*****			
	REQUIREMENT *****	NL	GPD	*****	*****		1/M	EST
002 pH	REPORTED *****			*****	*****			
	REQUIREMENT *****			6.0	9.0	SU	1/M	GRAB
146 ETHANOL	REPORTED *****			*****	*****			
	REQUIREMENT *****			*****	4100.0	UG/L	1/M	GRAB
172 ETHYLBENZENE	REPORTED *****			*****	*****			
	REQUIREMENT *****			*****	4.3	UG/L	1/M	GRAB
216 BENZENE (AS C6H6)	REPORTED *****			*****	*****			
	REQUIREMENT *****			*****	12.0	UG/L	1/M	GRAB
222 TOLUENE (AS C7H8)	REPORTED *****			*****	*****			
	REQUIREMENT *****			*****	43.0	UG/L	1/M	GRAB
331 METHYL-TERT- BUTYL ETHER	REPORTED *****			*****	*****			
	REQUIREMENT *****			*****	440.0	UG/L	1/M	GRAB
745 TOTAL XYLENES	REPORTED *****			*****	*****			
	REQUIREMENT *****			*****	33.0	UG/L	1/M	GRAB

Additional DMR Comments:

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW(M.G.)	TOTAL BOD5(K.G.)	OPERATOR IN RESPONSIBLE CHARGE		DATE	
				TYPED OR PRINTED NAME	SIGNATURE	YEAR	MO.
I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS TO THE BEST OF MY KNOWLEDGE AND BELIEF TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.				PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE		
				TYPED OR PRINTED NAME	SIGNATURE	YEAR <td>MO. <td>YEAR <td>MO. <td>DAY </td></td></td></td>	MO. <td>YEAR <td>MO. <td>DAY </td></td></td>

APPENDIX H

Air Permitting Calculations

Benzene Emissions Calculation Sheet
Toluene Emissions Calculation Sheet
Ethylbenzene Emissions Calculation Sheet
Total Xylenes Emissions Calculation Sheet
MTBE Emissions Calculation Sheet
TVPH Emissions Calculation Sheet



CALCULATION SHEET

06/30/15
FMMD1005

BENZENE EMISSIONS

PROBLEM:

Calculate a benzene emissions estimate based on data collected during the multiple well phase of the Dual Phase Extraction Pilot Study.

GIVEN:

Average RCP exhaust flow =	264 scfm
Average benzene concentration @ RCP =	171.31 mg/m ³
Max adjusted air stripper air flow rate =	140 scfm
Average benzene concentration @ air stripper =	13.73 mg/m ³
Mass conversions =	1000 mg = 1g 1 m ³ = 35.3147 ft ³
Weight conversion =	0.0022 lbs = 1 g
Time conversion =	60 min = 1hr

SOLUTION:

Using the site-specific information collected during the pilot study, an estimate of the total benzene emissions expected during long-term DPE implementation can be calculated. As the air stripper does not run continuously, emissions calculations were corrected to reflect an air stripper runtime of 25% of the total system runtime. Note that these calculations are based on values observed when free phase petroleum was readily available and are most likely overestimations.

$$\begin{aligned} \text{RCP Emissions} &= \text{Approximate RCP Air Flow Rate} \times \text{Avg Benzene Conc.} \times \text{Mass Conv.} \\ &\quad \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 264 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 171.31 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \\ &= 0.1690 \text{ lbs/hr or } 0.7402 \text{ tns/yr} \end{aligned}$$

$$\begin{aligned} \text{Air Stripper Emissions} &= \text{Max Adjusted Air Stripper Air Flow Rate} \times \text{Avg Benzene Conc.} \\ &\quad \times \text{Mass Conv.} \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 140 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 13.73 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \times \\ &\quad 25\% \\ &= 0.0018 \text{ lbs/hr or } 0.0079 \text{ tns/yr} \end{aligned}$$

$$\text{Total Hourly Emissions} = 0.1690 \text{ lbs/hr} + 0.0018 \text{ lbs/hr} = 0.1708 \text{ lbs/hr}$$

$$\text{Total Annual Emissions} = 0.7402 \text{ tns/yr} + 0.0079 \text{ tns/yr} = 0.7481 \text{ tns/yr}$$



CALCULATION SHEET

06/30/15
FMMD1005

TOLUENE EMISSIONS

PROBLEM:

Calculate a toluene emissions estimate based on data collected during the multiple well phase of the Dual Phase Extraction Pilot Study.

GIVEN:

Average RCP exhaust flow =	264 scfm
Average toluene concentration @ RCP =	1,669.88 mg/m ³
Max adjusted air stripper air flow rate =	140 scfm
Average toluene concentration @ air stripper =	634.25 mg/m ³
Mass conversions =	1000 mg = 1g 1 m ³ = 35.3147 ft ³
Weight conversion =	0.0022 lbs = 1 g
Time conversion =	60 min = 1hr

SOLUTION:

Using the site-specific information collected during the pilot study, an estimate of the total toluene emissions expected during long-term DPE implementation can be calculated. As the air stripper does not run continuously, emissions calculations were corrected to reflect an air stripper runtime of 25% of the total system runtime. Note that these calculations are based on values observed when free phase petroleum was readily available and are most likely overestimations.

$$\begin{aligned}\text{RCP Emissions} &= \text{Approximate RCP Air Flow Rate} \times \text{Avg Toluene Conc.} \times \text{Mass Conv.} \\ &\quad \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 264 \text{ scfm} \times 1 \text{ m}^3/35.3147 \text{ ft}^3 \times 1,669.88 \text{ mg/m}^3 \times 1 \text{ g}/1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \\ &= 1.6478 \text{ lbs/hr or } 7.2174 \text{ tns/yr}\end{aligned}$$

$$\begin{aligned}\text{Air Stripper Emissions} &= \text{Max Adjusted Air Stripper Air Flow Rate} \times \text{Avg Toluene Conc.} \\ &\quad \times \text{Mass Conv.} \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 140 \text{ scfm} \times 1 \text{ m}^3/35.3147 \text{ ft}^3 \times 634.25 \text{ mg/m}^3 \times 1 \text{ g}/1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \times \\ &\quad 25\% \\ &= 0.0830 \text{ lbs/hr or } 0.3635 \text{ tns/yr}\end{aligned}$$

$$\text{Total Hourly Emissions} = 1.6478 \text{ lbs/hr} + 0.0830 \text{ lbs/hr} = 1.7308 \text{ lbs/hr}$$

$$\text{Total Annual Emissions} = 7.2174 \text{ tns/yr} + 0.3635 \text{ tns/yr} = 7.5809 \text{ tns/yr}$$



06/30/15
FMMD1005

CALCULATION SHEET

ETHYLBENZENE EMISSIONS

PROBLEM:

Calculate a ethylbenzene emissions estimate based on data collected during the multiple well phase of the Dual Phase Extraction Pilot Study.

GIVEN:

Average RCP exhaust flow =	264 scfm
Average ethylbenzene concentration @ RCP =	275.63 mg/m ³
Max adjusted air stripper air flow rate =	140 scfm
Average ethylbenzene concentration @ air stripper =	67.41 mg/m ³
Mass conversions =	1000 mg = 1g 1 m ³ = 35.3147 ft ³
Weight conversion =	0.0022 lbs = 1 g
Time conversion =	60 min = 1hr

SOLUTION:

Using the site-specific information collected during the pilot study, an estimate of the total ethylbenzene emissions expected during long-term DPE implementation can be calculated. As the air stripper does not run continuously, emissions calculations were corrected to reflect an air stripper runtime of 25% of the total system runtime. Note that these calculations are based on values observed when free phase petroleum was readily available and are most likely overestimations.

$$\begin{aligned}\text{RCP Emissions} &= \text{Approximate RCP Air Flow Rate} \times \text{Avg Ethylbenzene Conc.} \times \text{Mass Conv.} \\ &\quad \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 264 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 275.63 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \\ &= 0.2720 \text{ lbs/hr or } 1.1914 \text{ tns/yr}\end{aligned}$$

$$\begin{aligned}\text{Air Stripper Emissions} &= \text{Max Adjusted Air Stripper Air Flow Rate} \times \text{Avg Ethylbenzene Conc.} \\ &\quad \times \text{Mass Conv.} \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 140 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 67.41 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \times \\ &\quad 25\% \\ &= 0.0088 \text{ lbs/hr or } 0.0385 \text{ tns/yr}\end{aligned}$$

$$\text{Total Hourly Emissions} = 0.2720 \text{ lbs/hr} + 0.0088 \text{ lbs/hr} = 0.2808 \text{ lbs/hr}$$

$$\text{Total Annual Emissions} = 1.1914 \text{ tns/yr} + 0.0385 \text{ tns/yr} = 1.2299 \text{ tns/yr}$$



CALCULATION SHEET

06/30/15
FMMD1005

XYLENES EMISSIONS

PROBLEM:

Calculate a xylenes emissions estimate based on data collected during the multiple well phase of the Dual Phase Extraction Pilot Study.

GIVEN:

Average RCP exhaust flow =	264 scfm
Average xylenes concentration @ RCP =	1,241.63 mg/m ³
Max adjusted air stripper air flow rate =	140 scfm
Average xylenes concentration @ air stripper =	378.25 mg/m ³
Mass conversions =	1000 mg = 1g 1 m ³ = 35.3147 ft ³
Weight conversion =	0.0022 lbs = 1 g
Time conversion =	60 min = 1hr

SOLUTION:

Using the site-specific information collected during the pilot study, an estimate of the total xylenes emissions expected during long-term DPE implementation can be calculated. As the air stripper does not run continuously, emissions calculations were corrected to reflect an air stripper runtime of 25% of the total system runtime. Note that these calculations are based on values observed when free phase petroleum was readily available and are most likely overestimations.

$$\begin{aligned} \text{RCP Emissions} &= \text{Approximate RCP Air Flow Rate} \times \text{Avg Xylenes Conc.} \times \text{Mass Conv.} \\ &\quad \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 264 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 1,241.63 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \\ &= 1.2252 \text{ lbs/hr or } 5.3664 \text{ tns/yr} \end{aligned}$$

$$\begin{aligned} \text{Air Stripper Emissions} &= \text{Max Adjusted Air Stripper Air Flow Rate} \times \text{Avg Xylenes Conc.} \\ &\quad \times \text{Mass Conv.} \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 140 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 378.25 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \times \\ &\quad 25\% \\ &= 0.0495 \text{ lbs/hr or } 0.2168 \text{ tns/yr} \end{aligned}$$

$$\text{Total Hourly Emissions} = 1.2252 \text{ lbs/hr} + 0.0495 \text{ lbs/hr} = 1.2747 \text{ lbs/hr}$$

$$\text{Total Annual Emissions} = 5.3664 \text{ tns/yr} + 0.2168 \text{ tns/yr} = 5.5832 \text{ tns/yr}$$



CALCULATION SHEET

06/30/15
FMMD1005

MTBE EMISSIONS

PROBLEM:

Calculate an MTBE emissions estimate based on data collected during the multiple well phase of the Dual Phase Extraction Pilot Study.

GIVEN:

Average RCP exhaust flow =	264 scfm
Average MTBE concentration @ RCP =	123.50 mg/m ³
Max adjusted air stripper air flow rate =	140 scfm
Average MTBE concentration @ air stripper =	37.36 mg/m ³
Mass conversions =	1000 mg = 1g 1 m ³ = 35.3147 ft ³
Weight conversion =	0.0022 lbs = 1 g
Time conversion =	60 min = 1hr

SOLUTION:

Using the site-specific information collected during the pilot study, an estimate of the total MTBE emissions expected during long-term DPE implementation can be calculated. As the air stripper does not run continuously, emissions calculations were corrected to reflect an air stripper runtime of 25% of the total system runtime. Note that these calculations are based on values observed when free phase petroleum was readily available and are most likely overestimations.

$$\begin{aligned}\text{RCP Emissions} &= \text{Approximate RCP Air Flow Rate} \times \text{Avg MTBE Conc.} \times \text{Mass Conv.} \\ &\quad \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 264 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 123.50 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \\ &= 0.1219 \text{ lbs/hr or } 0.5339 \text{ tns/yr}\end{aligned}$$

$$\begin{aligned}\text{Air Stripper Emissions} &= \text{Max Adjusted Air Stripper Air Flow Rate} \times \text{Avg MTBE Conc.} \\ &\quad \times \text{Mass Conv.} \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 140 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 37.36 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \times \\ &\quad 25\% \\ &= 0.0049 \text{ lbs/hr or } 0.0215 \text{ tns/yr}\end{aligned}$$

$$\text{Total Hourly Emissions} = 0.1219 \text{ lbs/hr} + 0.0049 \text{ lbs/hr} = 0.1268 \text{ lbs/hr}$$

$$\text{Total Annual Emissions} = 0.5339 \text{ tns/yr} + 0.0215 \text{ tns/yr} = 0.5554 \text{ tns/yr}$$



CALCULATION SHEET

06/30/15
FMMD1005

TOTAL VOCs EMISSIONS

PROBLEM:

Calculate a total VOCs emissions estimate based on data collected during the multiple well phase of the Dual Phase Extraction Pilot Study.

GIVEN:

Average RCP exhaust flow =	264 scfm
Average VOCs concentration @ RCP =	14,997.50 mg/m ³
Max adjusted air stripper air flow rate =	140 scfm
Average VOCs concentration @ air stripper =	1,174.88 mg/m ³
Mass conversions =	1000 mg = 1g 1 m ³ = 35.3147 ft ³
Weight conversion =	0.0022 lbs = 1 g
Time conversion =	60 min = 1hr

SOLUTION:

Using the site-specific information collected during the pilot study, an estimate of the total VOCs emissions expected during long-term DPE implementation can be calculated. As the air stripper does not run continuously, emissions calculations were corrected to reflect an air stripper runtime of 25% of the total system runtime. Note that these calculations are based on values observed when free phase petroleum was readily available and are most likely overestimations.

$$\begin{aligned} \text{RCP Emissions} &= \text{Approximate RCP Air Flow Rate} \times \text{Avg VOCs Conc.} \times \text{Mass Conv.} \\ &\quad \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 264 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 14,997.50 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \\ &= 14.7993 \text{ lbs/hr or } 64.8209 \text{ tns/yr} \end{aligned}$$

$$\begin{aligned} \text{Air Stripper Emissions} &= \text{Max Adjusted Air Stripper Air Flow Rate} \times \text{Avg VOCs Conc.} \\ &\quad \times \text{Mass Conv.} \times \text{Weight Conv.} \times \text{Time Conv.} \\ &= 140 \text{ scfm} \times 1 \text{ m}^3 / 35.3147 \text{ ft}^3 \times 1,174.88 \text{ mg/m}^3 \times 1 \text{ g} / 1000 \text{ mg} \times 0.0022 \text{ lb/g} \times 60 \text{ min/hr} \times \\ &\quad 25\% \\ &= 0.1537 \text{ lbs/hr or } 0.6732 \text{ tns/yr} \end{aligned}$$

$$\text{Total Hourly Emissions} = 14.7993 \text{ lbs/hr} + 0.1537 \text{ lbs/hr} = 14.9530 \text{ lbs/hr}$$

$$\text{Total Annual Emissions} = 64.8209 \text{ tns/yr} + 0.6732 \text{ tns/yr} = 65.4941 \text{ tns/yr}$$

APPENDIX I

Air Operating Permit Application

Submittal Letter Dated June 30, 2015
Completed Form 7

Air Emissions Calculations are included in Appendix H



Mr. David J. Brown
Department of Environmental Quality
Blue Ridge Regional Office-Lynchburg
7705 Timberlake Road
Lynchburg, VA 24502

June 30, 2015

RE: Nonbinding Applicability Determination Request, Meadows of Dan Food Market, 2609 Jeb Stuart Highway, Meadows of Dan, Patrick County, Virginia, PC 2014-2256

Mr. Brown,

Greene Environmental Services, LLC (Greene) is requesting a nonbinding applicability determination as part of the Corrective Action Plan (CAP) being developed for the Meadows of Dan Food Market facility addressed as 2609 Jeb Stuart Highway, Meadows of Dan, VA 24120. Based on the information provided, Greene believes the proposed remediation activities may qualify for exemption from permitting requirements. As such, no application fee has been included.

As explained in the CAP, Greene has identified Dual Phase Extraction (DPE) as the best fit technology for the recovery of the free phase gasoline contamination at the site. Dual Phase Extraction also referenced as vacuum enhanced recovery or multi-phase extraction, utilizes a high volume vacuum pump to exert strong negative pressure on the subsurface via extraction wells. This technology is capable of simultaneously removing soil vapors, contaminated groundwater, and free phase product from the subsurface resulting in an overall decrease in all subsurface contamination phases.

A significant vacuum will be generated by the vacuum pump or pumps and exerted through a system of subsurface piping to the selected recovery wells. The recovery stream consisting of liquid and gaseous waste will immediately enter a phase separation vessel. Any vapors recovered from the subsurface will proceed through a proposed 2,000 pound vapor phase carbon vessel prior to exiting the system via the vacuum pump(s) exhaust stack. The majority of the petroleum contamination is expected to be recovered through this pathway. Any recovered liquids will be retained in the phase separation vessel until transferred to an oil water separator. Any free phase contamination still present will be drained by gravity to a product storage tank. The remaining water will be transferred through bag filters, liquid phase carbon units, and an air stripper where clean air will be used to reduce the concentration of any dissolved contamination. The air stripper exhaust will be vented to the atmosphere through the exhaust stack and the water will exit the system and be drained to a grassy ditch as approved by the Virginia Pollutant Discharge Elimination System (VPDES) General Permit.

Based on a 14-day pilot study, Greene performed emission estimates for the proposed remediation system. It is important to note that the emission estimates are based on observations made while significant volumes of liquid free phase petroleum were recovered and volatilized by the DPE system. This most likely resulted in elevated vapor phase concentration levels. Similarly elevated vapor phase concentration levels are to be expected during the initial quarter of long term system operation. Emission calculations reveal that likely overestimated emissions of expected Hazardous Pollutants (HAPs), BTEX constituents and MTBE, are less than their respective hourly and annual exemption rates, while total VOC emissions is greater than its annual exemption level. There are no hourly limitations of total VOC emissions.

Using only the observations made during the pilot study without vapor phase carbon treatment, implementation of a DPE system would require an application for a state operating permit because of the projected annual emissions of total VOCs. However, as previously mentioned the pilot study emissions are likely overestimated due to the significant volume of readily available free phase petroleum and the lack of vapor phase carbon treatment. The addition of vapor phase carbon treatment is expected to greatly reduce the actual observed total VOCs emissions during long term DPE implementation. Greene will monitor the mass of petroleum exiting the remediation system throughout the entire long term remediation. Pre and post vapor phase carbon unit air samples will be collected and mass removal calculations will be performed. The vapor phase carbon will be replaced as necessary to prevent exceeding the exemption rate of 25 tons per year. Copies of the completed Form 7 and the emission calculations are included.

Should you have any questions about this application or need additional information, please feel free to contact me at (540) 483-3311.

Sincerely,



Marshall Adam Flora (Adam)
Project Manager

Enclosures



AIR PERMIT APPLICATION
CHECK ALL PAGES ATTACHED AND LIST ALL ATTACHED DOCUMENTS

- | | |
|---|--|
| <input type="checkbox"/> Local Government Certification Form, Page 3 | <input type="checkbox"/> Proposed Permit Limits for GHGs on CO ₂ e Basis, Page 26 |
| <input type="checkbox"/> Application Fee Form, Pages 4-6 | <input type="checkbox"/> BAE for Criteria Pollutants, Page 27 |
| <input checked="" type="checkbox"/> Document Certification Form, Page 7 | <input type="checkbox"/> BAE for GHGs on Mass Basis, Page 28 |
| <input checked="" type="checkbox"/> General Information, Pages 8-9 | <input type="checkbox"/> BAE for GHGs on CO ₂ e Basis, Page 29 |
| <input type="checkbox"/> Fuel Burning Equipment, Page 10 | <input type="checkbox"/> Operating Periods, Page 30 |
| <input type="checkbox"/> Stationary Internal Combustion Engines, Page 11 | |
| <input type="checkbox"/> Incinerators, Page 12 | <u>ATTACHED DOCUMENTS:</u> |
| <input checked="" type="checkbox"/> Processing, Page 13 | <input checked="" type="checkbox"/> Map of Site Location |
| <input type="checkbox"/> Inks, Coatings, Stains, and Adhesives, Page 14 | <input checked="" type="checkbox"/> Facility Site Plan |
| <input type="checkbox"/> VOC/Petroleum Storage Tanks, Pages 15-16 | <input checked="" type="checkbox"/> Process Flow Diagram/Schematic |
| <input type="checkbox"/> Loading Rack and Oil-Water Separators, Page 17 | <input type="checkbox"/> MSDS or CPDS Sheets |
| <input type="checkbox"/> Fumigation Operations, Page 18 | <input checked="" type="checkbox"/> Estimated Emission Calculations |
| <input checked="" type="checkbox"/> Air Pollution Control and Monitoring Equipment, Page 19 | <input type="checkbox"/> Stack Tests |
| <input type="checkbox"/> Air Pollution Control/Supplemental Information, Page 20 | <input type="checkbox"/> Air Modeling Data |
| <input checked="" type="checkbox"/> Stack Parameters and Fuel Data, Page 21 | <input type="checkbox"/> Confidential Information (see Instructions) |
| <input checked="" type="checkbox"/> Proposed Permit Limits for Criteria Pollutants, Page 22 | <input type="checkbox"/> BACT Analysis |
| <input checked="" type="checkbox"/> Proposed Permit Limits for Toxic Pollutants/HAPs, Page 23 | |
| <input type="checkbox"/> Proposed Permit Limits for Other Reg. Pollutants, Page 24 | |
| <input type="checkbox"/> Proposed Permit Limits for GHGs on Mass Basis, Page 25 | |

Check added form sheets above; also indicate the number of copies of each form in blank provided.

DOCUMENT CERTIFICATION FORM

I certify under penalty of law that this document and all attachments [as noted above] were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering and evaluating the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I certify that I understand that the existence of a permit under [Article 6 of the Regulations] does not shield the source from potential enforcement of any regulation of the board governing the major NSR program and does not relieve the source of the responsibility to comply with any applicable provision of the major NSR regulations.

SIGNATURE: _____	DATE: <u>June 30, 2015</u>
NAME: <u>Marshall Adam Flora</u>	REGISTRATION NO: _____
TITLE: <u>Project Manager</u>	COMPANY: <u>Greene Environmental Services, LLC</u>
PHONE: <u>540-483-3311</u>	ADDRESS: <u>200 Buckwheat Lane</u>
EMAIL: <u>aflora@greene-environmental.com</u>	<u>Rocky Mount, VA 24151</u>

References: Virginia Regulations for the Control and Abatement of Air Pollution (Regulations), 9 VAC 5-20-230B and 9 VAC 5-80-1140E.

GENERAL INFORMATION

Person Completing Form: Marshall Adam Flora		Date: 06/30/2015	Registration Number:
Company and Division Name: Greene Environmental Services, LLC			FIN: 061753094
Mailing Address: 200 Buckwheat Lane, Rocky Mount, VA 24151			
Exact Source Location – Include Name of City (County) and Full Street Address or Directions: Meadows of Dan Food Market; 2609 Jeb Stuart Highway, Meadows of Dan, VA 24120			
Telephone Number: 540-483-3311	No. of Employees: 5 (estimated)	Property Area at Site: Approximately 1.07 acres	
Person to Contact on Air Pollution Matters – Name and Title: Marshall Adam Flora; Greene Environmental Services, LLC; Project Manager		Phone Number: 540-483-3311	
		Fax: 540-483-3381	
		Email: aflora@greene-environmental.com	
Latitude and Longitude Coordinates OR UTM Coordinates of Facility: 36.7353972 N 80.4077838 W			

Reason(s) for Submission (Check all that apply):

<input type="checkbox"/> State Operating Permit	This permit is applied for pursuant to provisions of the Virginia Administrative Code, 9 VAC 5 Chapter 80, Article 5 (SOP)
---	--

<input type="checkbox"/> New Source	This permit is applied for pursuant to the following provisions of the Virginia Administrative Code: <input type="checkbox"/> 9 VAC 5 Chapter 80, Article 6 (Minor Sources) <input type="checkbox"/> 9 VAC 5 Chapter 80, Article 8 (PSD Major Sources) <input type="checkbox"/> 9 VAC 5 Chapter 80, Article 9 (Non-Attainment Major Sources)
<input type="checkbox"/> Modification of a Source	
<input type="checkbox"/> Relocation of a Source	

Amendment to a Permit Dated: _____ Permit Type: SOP (Art. 5) NSR (Art. 6, 8, 9)

Amendment Type: <input type="checkbox"/> Administrative Amendment <input type="checkbox"/> Minor Amendment <input type="checkbox"/> Significant Amendment	This amendment is requested pursuant to the provisions of: <input type="checkbox"/> 9 VAC 5-80-970 (Art. 5 Adm.) <input type="checkbox"/> 9 VAC 5-80-1935 (Art. 8 Adm.) <input type="checkbox"/> 9 VAC 5-80-980 (Art. 5 Minor) <input type="checkbox"/> 9 VAC 5-80-1945 (Art. 8 Minor) <input type="checkbox"/> 9 VAC 5-80-990 (Art. 5 Sig.) <input type="checkbox"/> 9 VAC 5-80-1955 (Art. 8 Sig.) <input type="checkbox"/> 9 VAC 5-80-1270 (Art. 6 Adm.) <input type="checkbox"/> 9 VAC 5-80-2210 (Art. 9 Adm.) <input type="checkbox"/> 9 VAC 5-80-1280 (Art. 6 Minor) <input type="checkbox"/> 9 VAC 5-80-2220 (Art. 9 Minor) <input type="checkbox"/> 9 VAC 5-80-1290 (Art. 6 Sig.) <input type="checkbox"/> 9 VAC 5-80-2230 (Art. 9 Sig.)
---	---

Other (specify): Requesting a nonbinding applicability determination

Explanation of Permit Request (attach documents if needed):

A remediation system is being installed as part of corrective action associated with PC#2014-2256. The remediation system will utilize vacuum pumps to extract free phase petroleum as well as petroleum impacted groundwater and vapor. The system will discharge vapor from two vent stacks. One vent stack will be the vacuum pump discharge and the second will be an air stripper discharge. Greene is attempting to determine if the remediation system will be exempt.

GENERAL INFORMATION (CONTINUED)

For Portable Plants:		
Is this facility designed to be portable?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
• If yes, is this facility already permitted as a portable plant?	<input type="checkbox"/> Yes	<input type="checkbox"/> No Permit Date: _____
If not permitted, is this an application to be permitted as a portable plant?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
If permitted as a portable facility, is this a notification of relocation?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Describe the new location or address (include a site map): _____		
• Will the portable facility be co-located with another source? <input type="checkbox"/> Yes <input type="checkbox"/> No Reg. No. _____		
• Will the portable facility be modified or reconstructed as a result of the relocation?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Will there be any new emissions other than those associated with the relocation?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
• Is the facility suitable for the area to which it will be located? (attach documentation)	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Describe the products manufactured and/or services performed at this facility:

Gasoline contamination will be recovered from the subsurface using dual phase extraction technology. Volatile organic compounds will be released into the atmosphere.

List the Standard Industrial Classification (SIC) Code(s) for the facility:

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List the North American Industry Classification System (NAICS) Code(s) for the facility:

--	--	--

List all the facilities in Virginia under common ownership or control by the owner of this facility:

N/A

Milestones: This section is to be completed if the permit application includes a new emissions unit or modification to existing operations.

Milestones*:	Starting Date:	Estimated Completion Date:
New Equipment Installation	11/01/2015 (estimated)	11/01/2017 (estimated)
Modification of Existing Process or Equipment	N/A	N/A
Start-up Dates	11/01/2015 (estimated)	11/01/2017 (estimated)

*For new or modified installations to be constructed in phased schedule, give construction/installation starting and completion date for each phase.

PROCESSING, MANUFACTURING, SURFACE COATING AND DEGREASING OPERATIONS:

Company Name: Greene Environmental Services, LLC	Date: 06/30/2015	Registration Number:
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Unit Ref. No.	Process or Operation Name	Equipment Manufacturer, Type, and Model Number	Date of Manuf.	Date of Const.	Max. Rated Capacity (____/hr)*	Requested Throughput*		Federal Regulations that Apply
						(____/hr)	(____/day) (____/yr)	
1	Rotary claw vacuum pump: Extracting subsurface gasoline contamination	3-Ohio Medical Corporation rotary claw vacuum pumps (operated in parallel) model# C10	Unknown	Unknown	765 ACFM at 15" Hg vacuum			
2	Air Stripper: Treating gasoline contaminated groundwater	4 tray-EZ Tray Steel Air Stripper Model# 4.4 SS	Unknown	Unknown	25 gpm 140 SCFM			

Estimated Emission Calculations Attached (include references of emission factors) and/or Stack Test Results if Available

* Specify units for each operation in tons, pounds, gallons, etc., as applicable. For coating operations, the maximum rated capacity is the spray gun capacity.

AIR POLLUTION CONTROL AND MONITORING EQUIPMENT:

Company Name: Greene Environmental Services, LLC	Date: 06/30/2015	Registration Number:
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Unit Ref. No.	Vent/ Stack No.	Device Ref. No.	Pollutant/Parameter	Air Pollution Control Equipment			Monitoring Instrumentation
				Manufacturer and Model No.	Type (use Code N)	Percent Efficiency (%)	
1			VOCs (BTEX, MTBE, TVPH)	Mid-Atlantic Environmental Equipment, Inc. Model VSV-2000	18 a		Laboratory analysis
2			VOCs (BTEX, MTBE, TVPH)				Laboratory analysis

Manufacturer Specifications Included

Code N – Type of Air Pollution Control Equipment	Manufacturer Specifications Included
1. Settling Chamber 2. Cyclone 3. Multicyclone 4. Cyclone scrubber 5. Orifice scrubber 6. Mechanical scrubber 7. Venturi scrubber a. Fixed throat b. Variable throat 8. Mist eliminator 9. Filter a. Baghouse b. Other: _____ 10. Electrostatic Precipitator	a. Hot side b. Cold side c. High voltage d. Low voltage e. Single stage f. Two stage g. Other: _____ 11. Catalytic Afterburner 12. Direct Flame Afterburner 13. Diesel Oxidation Catalyst (DOC) 14. Thermal Oxidizer 15. Regenerative Thermal Oxidizer (RTO) 16. Selective Catalytic Reduction (SCR) 17. Selective Non-Catalytic Reduction (SNCR)
	17. Absorber a. Packed tower b. Spray tower c. Tray tower d. Venturi e. Other: _____ 18. Adsorber a. Activated carbon b. Molecular sieve c. Activated alumina d. Silica gel e. Other: _____ 19. Condenser (specify) _____ 20. Other: _____

STACK PARAMETERS AND FUEL DATA:

Company Name: Greene Environmental Services, LLC	Date: 06/30/2015	Registration Number:
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Unit Ref. No.	Vent/Stack No.	Vent/Stack or Exhaust Data					Fuel(s) Data					
		Vent/Stack Config. (use Code O)	Vent/Stack Height (feet)	Exit Diameter (feet)	Exit Gas Velocity (ft/sec)	Exit Gas Flow Rate (acfm)	Exit Gas Temp. (°F)	Type of Fuel	Heating Value* (Btu/_____)	Max. Rated Burned/hr (specify units)	Max. Sulfur %	Max. Ash %
1	1	5	10	0.25		765 (max)	Variable	N/A				
2	2	5	10	0.33		140 (max)	Variable	N/A				

Code O – Vent/Stack Configuration

1. Stack discharging downward, or nearly downward
2. Equivalent stack representing a combination of multiple actual stacks
3. Gooseneck stack
4. Stack discharging in a horizontal direction
5. Stack with an unobstructed opening discharge in a vertical direction
6. Vertical stack with a weather cap or similar obstruction in exhaust system

* Specify units for each heating value in Btus per unit of fuel.

PROPOSED PERMIT LIMITS FOR CRITERIA POLLUTANTS:

Company Name: Greene Environmental Services, LLC	Date: 06/30/2015	Registration Number:
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Proposed Permit Limits for Criteria Pollutants																							
Unit Ref. No.	PM ^a (Particulate Matter)		PM-10 ^{a,b} (10 µM or smaller particulate matter)		PM 2.5 ^{a,b} (2.5 µM or smaller particulate matter)		SO ₂ (Sulfur Dioxide)		NO _x (Nitrogen Oxides)		CO (Carbon Monoxide)		VOC ^a (Volatile Organic Compounds)		Pb (Lead)								
	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr							
1												14.80	64.82										
2												0.15	0.67										
<p><i>The above estimates are based on what are thought to be artificially high readings, which were observed during a pilot study where vapor phase activated carbon treatment was not installed. Greene expects the remediation efforts to occur for longer than one year. During this long term system operation, the readily available free phase petroleum will likely be removed within the first quarter of system operation. During this initial quarter of system operation, Greene will install a 2,000 pound vapor phase carbon unit on the RCP (Unit Ref. No. 1) vapor stream that will reduce/eliminate the mass of petroleum entering the atmosphere. Greene will monitor the mass of petroleum entering the atmosphere throughout the entire long term remediation system operation. Pre and post vapor phase carbon unit air samples will be collected and mass removal calculations will be performed. The vapor phase carbon will be replaced as necessary to prevent exceeding the exemption rate of 25 tons per year.</i></p>																							
TOTAL:													14.95	65.49									

Estimated Emission Calculations Attached (totals and per Unit Ref. No.)

^a PM, PM-10, PM 2.5, and VOC should also be split up by component and reported under the Proposed Permit Limits for Toxic Pollutants/HAPs.

^b PM-10 and PM 2.5 includes filterable and condensable.

PROPOSED PERMIT LIMITS FOR TOXIC POLLUTANTS/HAPS:

Company Name: Greene Environmental Services, LLC	Date: 06/30/2015	Registration Number:
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Unit Ref. No.	Proposed Permit Limits for Toxic/HAP Pollutants*																	
	HAP Name: Benzene		HAP Name: Toluene		HAP Name: Ethylbenzene		HAP Name: Xylenes		HAP Name: MTBE		HAP Name:		HAP Name:					
	CAS #: 71-43-2	tons/yr	CAS #: 108-88-3	tons/yr	CAS #: 100-41-4	tons/yr	CAS #: 1330-20-7	tons/yr	CAS #: 1634-04-4	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
1	0.169	0.740	1.648	7.217	0.272	1.191	1.225	5.366	0.122	0.534								
2	0.002	0.008	0.083	0.364	0.009	0.039	0.050	0.217	0.005	0.022								
TOTAL:	0.171	0.748	1.731	7.581	0.281	1.230	1.275	5.583	0.127	0.556								

Estimated Emission Calculations Attached (totals and per Unit Ref. No.)

* Specify the name of the toxic pollutant/HAP for each Unit Ref. No. along with the respective CAS Number. Toxic Pollutant means a pollutant on the designated list in the Form 7 Instructions document. Particulate matter and volatile organic compounds are not toxic pollutants as generic classes of substances, but individual substances within these classes may be toxic pollutants because their toxic properties or because a TLV (tm) has been established.

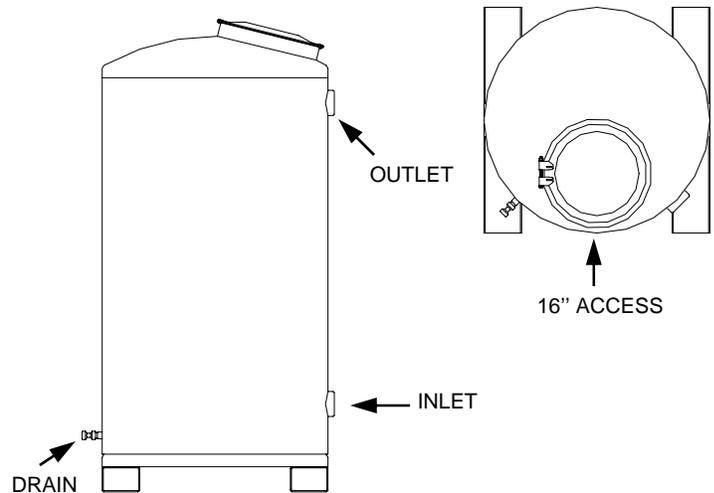
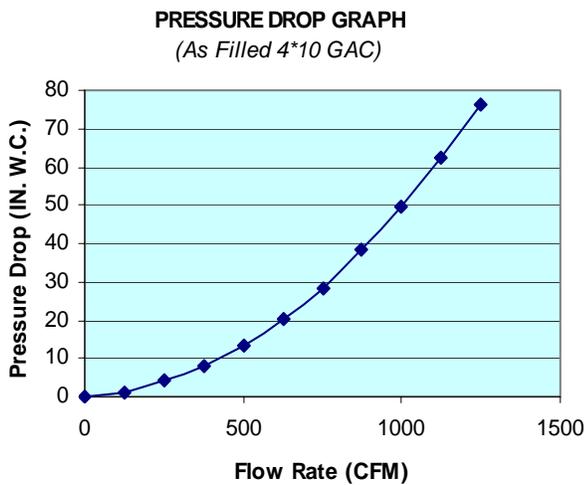


MID-ATLANTIC ENVIRONMENTAL EQUIPMENT, INC.

PRODUCT DATA SHEET VS SERIES FILTERS MODEL VSV-2000

The VSV-2000 filter is a media filter vessel designed to treat vapor streams where pressure drop is a strong concern. While the typical design application is a activated carbon adsorption unit, the filter can easily accommodate many medias. The sturdy construction makes these filter vessels ideal for long term treatment units. Some applications include:

- Soil Vapor Extraction Treatment
- Air Stripper Off Gas Treatment
- Odor Removal System
- Storage Tank Purge Vapor Treatment
- Pilot Study
- Industrial Process Treatment

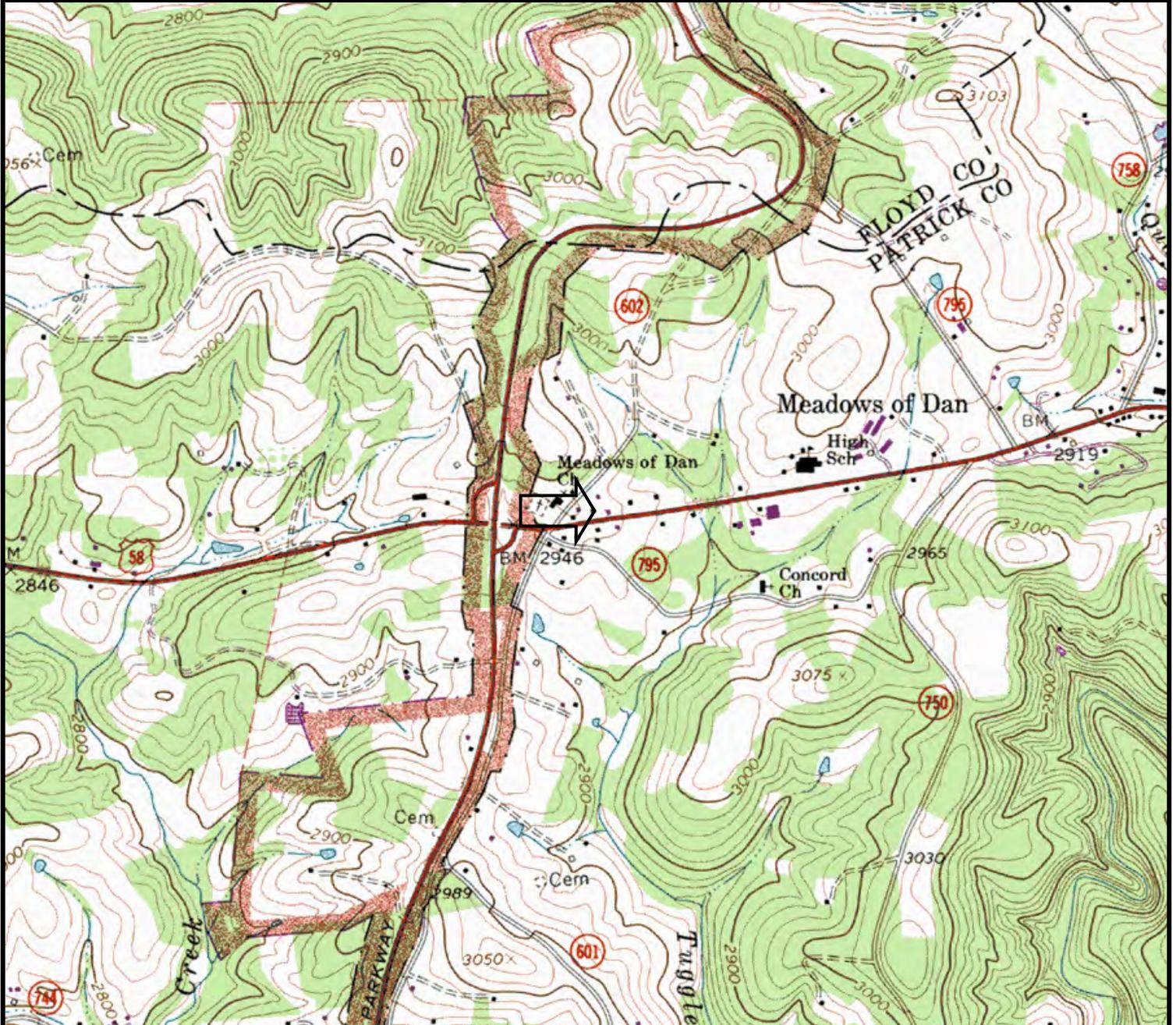


VSV-2000 SPECIFICATIONS			
Overall Height	7'7"	Vessel/Internal Piping Materials	CS/ SCH 40 PVC
Diameter	48"	Internal Coating	Polyamide Epoxy Resin
Inlet / Outlet (FNPT)	4"	External Coating	Urethane Enamel
Drain / Vent (FNPT)	3/4"	Maximum Pressure / Temp	10 PSIG / 140° F
GAC Fill (lbs)	2000	Cross Sectional Bed Area	12.5 FT ²
Shipping / Operational Weight (lbs)	2,925/3,425	Bed Depth/Volume	5.7 FT / 71 FT ³

Mid-Atlantic Environmental Equipment, Inc.
15 Carroll Drive • Bluffton, South Carolina 29910
Phone: 843.836.1804 • Fax: 843.836.1805

Topographic Map

Meadows of Dan Food Market
2609 Jeb Stuart Highway
Meadows of Dan, Virginia 24120



ENVIRONMENTAL SERVICES LLC
200 Buckwheat Lane, Rocky Mount, Virginia 24151

Office: 540-483-3311 or 800-215-2596

Fax: 540-483-3381

www.greene-environmental.com

MEADOWS of DAN, VIRGINIA

Source: U.S.G.S. Topographic Map of the Meadows of Dan Quadrangle, Virginia, 7.5 Minute Series (1968, revised 1985)

Scale: Not to Scale Contour Interval: 20 Feet
Vertical Datum: National Geodetic Vertical Datum 1929

Horizontal Datum: North American Datum 1927

Project: Corrective Action Plan

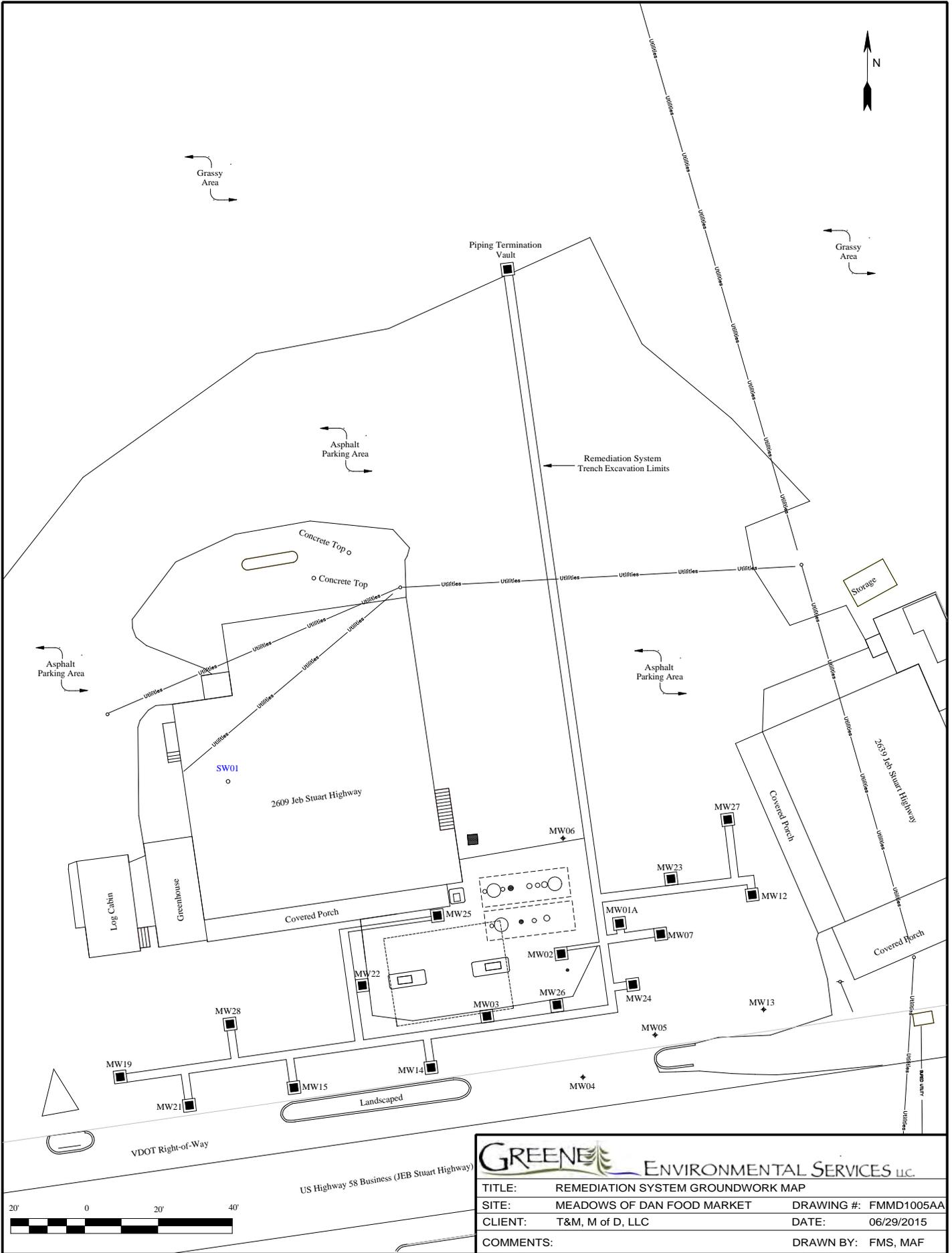
Client: T&M, M of D, L.L.C.

Greene Job #: FMMD1005

Date: June 17, 2015

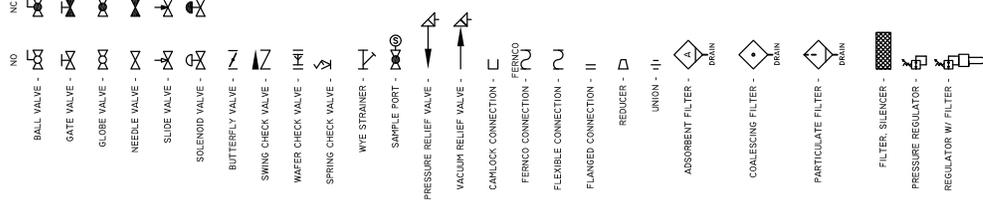


Latitude: 036.7353972° N
Longitude: 080.4077838° W

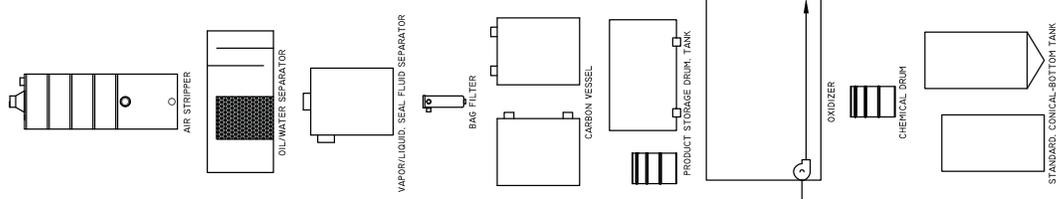


TITLE:	REMEDATION SYSTEM GROUNDWORK MAP	
SITE:	MEADOWS OF DAN FOOD MARKET	DRAWING #: FMMD1005AA
CLIENT:	T&M, M of D, LLC	DATE: 06/29/2015
COMMENTS:		DRAWN BY: FMS, MAF

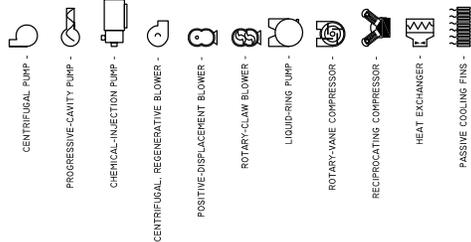
VALVES AND PIPING



EQUIPMENT



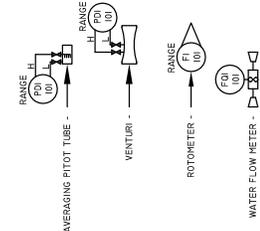
EQUIPMENT



EQUIPMENT

- AS - AIR STRIPPER
- BL - BLOWER
- ELT - FILTER VESSEL
- LPC - LIQUID-PHASE CARBON VESSEL
- MPD - MANIFOLD
- OX - OXIDIZER
- PST - PRODUCT STORAGE TANK
- PSL - PRESSURE SILENCER
- SMS - SEAL WATER SEPARATOR
- TMK - TANK
- WLS - VAPOR/LIQUID SEPARATOR
- WPC - VAPOR-PHASE CARBON VESSEL

FLOW MEASUREMENT



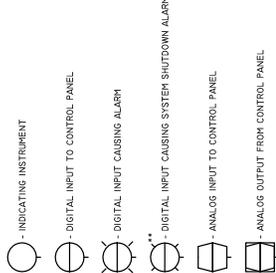
INSTRUMENT DESIGNATION

INPUT	1ST MODIFIER	2ND MODIFIER	3RD MODIFIER	OUTPUT	1ST MODIFIER
A					A
B					B
C					C
D					D
E					E
F					F
G					G
H					H
I					I
J					J
K					K
L					L
M					M
N					N
O					O
P					P
Q					Q
R					R
S					S
T					T
U					U
V					V
W					W
X					X
Y					Y
Z					Z

SYSTEM POSITION DESIGNATION

- 100 - VACUUM INLET MANIFOLD
- 300 - INLET HEAT EXCHANGER
- 400 - VAPOR/LIQUID SEPARATOR
- 500 - VAPOR/LIQUID SEPARATOR - 2
- 700 - SOLID-VAPOR EXTRACTION
- 1000 - LIQUID-RING PUMP
- 1500 - LIQUID-RING PUMP
- 1600 - VAPOR-PHASE CARBON
- 1900 - OXIDIZER
- 2200 - AIR SPARGE
- 2500 - SPARGE HEAT EXCHANGER
- 2800 - SPARGE OUTLET MANIFOLD
- 3000 - AIR COMPRESSOR
- 3400 - COMPRESSED-AIR OUTLET MANIFOLD
- 3700 - PNEUMATIC WELL PUMPS
- 4000 - SURFACE-MOUNT WELL PUMPS
- 4300 - SURFACE-MOUNT WELL PUMPS
- 4600 - GROUNDWATER INLET MANIFOLD
- 4900 - OIL/WATER SEPARATOR
- 5200 - PRODUCT STORAGE TANK
- 5500 - INLET TANK
- 5800 - UPSTREAM BAG FILTER
- 6000 - CHEMICAL INJECTION
- 6400 - AIR STRIPPER
- 6500 - SURFACE-MOUNT BAG FILTER
- 7000 - LIQUID-PHASE CARBON
- 7100 - PRE-MEDIA BAG FILTER
- 7200 - ACTIVATED ALUMINA
- 7300 - DISCHARGE TANK
- 7400 - POST-TREATMENT BAG FILTER
- 7600 - REINJECTION
- 7900 - BUILDING-TRAILER OR SKID
- 8200 - CONTROL PANEL
- 8300 - CHEMICAL PARTS
- 9900 - EXTRAS

INSTRUMENT IDENTIFICATION



EXAMPLE



APPENDIX J

Associated Documents

VA DEQ Request Letter Dated March 19, 2015
Public Notice Verification – The Enterprise



COMMONWEALTH of VIRGINIA

Molly Joseph Ward
Secretary of Natural Resources

Lynchburg Office
7705 Timberlake Road
Lynchburg, Virginia 24502
(434) 582-5120
Fax (434) 582-5125

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office
www.deq.virginia.gov

David K. Paylor
Director

Robert J. Weld
Regional Director

Roanoke Office
3019 Peters Creek Road
Roanoke, Virginia 24019
(540) 562-6700
Fax (540) 562-6725

March 19, 2015

T&M, M of D, L.L.C.
c/o Ms. Audra Weddle
P. O. Box 709
Riner, Virginia 24149

RE: Corrective Action Plan Request, Petroleum Release Investigation, Meadows of Dan Food Market,
2609 Jeb Stuart Highway, Meadow of Dan, Patrick County, Virginia, PC 2014-2256

Dear Ms. Weddle:

The staff has reviewed the Interim Authorization Corrective Action Plan Implementation Report as submitted for the subject facility and has determined that corrective action is necessary at the referenced site. In accordance with Section 6.6 of 9 VAC 25-580-10, et seq., you are required to develop and submit an appropriate Corrective Action Plan (CAP) to this regional office by **June 30, 2015**.

The original Site Characterization Report (SCR) and Interim Authorization Corrective Action Plan Implementation Report submitted to the Department of Environmental Quality (DEQ) are the basis for the development of your CAP. The CAP is to address remediation of free phase petroleum contamination on the ground water table. The cleanup endpoint for corrective action is <0.01 feet free product. A list of elements usually required in a CAP Report is presented in a fact sheet available at: <http://www.deq.virginia.gov/Portals/0/DEQ/Land/Tanks/012024dappendices.pdf>. The CAP must include a complete remediation assessment and provide a remediation technology recommendation.

Should the clean up technology proposed for site remediation result in emissions of petroleum constituents to the atmosphere, permitting requirements and risks associated with such emissions must be evaluated.

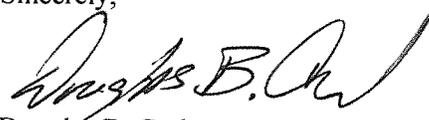
To satisfy public participation requirements of VR 680-13-2 for conducting a Corrective Action Plan at your site, you must publish the attached notification with the appropriate site specific information in *The Enterprise*, Stuart, Virginia. This notice should be published once per week for two consecutive weeks in the legal section in the smallest print possible. Proof of public notice publication must be provided to this office by the enclosed public notice verification sheet completed and signed by the newspaper or actual copies of the pages from the newspaper showing the notice and date of the newspaper.

T&M, M of D, L.L.C.
c/o Ms. Audra Weddle
Page 2.

The Virginia Petroleum Storage Tank Fund (VPSTF) has established procedures for financial reimbursement of corrective action activities. To ensure eligibility for reimbursement from the VPSTF it is necessary that activities be **prior approved** by the Regional Office. You or your consultant should fill out a Petroleum Cleanup Activity Authorization Form for each appropriate task to complete the required activities. The completed form(s) should be submitted to this office by **April 30, 2015** in order that prior authorization for this work may be provided. (Fact Sheet available at <http://www.deq.virginia.gov/Portals/0/DEQ/Land/Tanks/012024dappendices.pdf>).

Should you have any questions concerning these matters please contact me at this office, (540) 562-6796.

Sincerely,



Douglas B. Carl
Remediation Specialist

Referenced Documents (also available upon request):

007 AAF: <http://www.deq.virginia.gov/Portals/0/DEQ/Land/Tanks/007aafs.zip>

Virginia Petroleum Storage Tank Fund (VPSTF) Fact Sheets:

<http://www.deq.virginia.gov/Portals/0/DEQ/Land/Tanks/012024dappendices.pdf>

Attachments: Public Notice
Public Notice Verification

Cc: File (PC 2014-2256) (w attachments)
Trev Greene, Greene Environmental (electronic copy) (w attachments)

PUBLIC NOTICE

PROPOSAL TO CLEANUP
AN UNDERGROUND STORAGE TANK (UST) SITE

There has been a release from a petroleum storage tank system at:

Meadows of Dan Food Market
2609 Jeb Stuart Highway
Meadows of Dan, Virginia 24120

The Department of Environmental Quality (DEQ) is requiring T&M, M of D, L.L.C. to develop a Corrective Action Plan to address cleanup of petroleum contamination at the site. If you have questions regarding the cleanup please contact:

T&M, M of D, L.L.C.
c/o Ms. Audra Weddle
P. O. Box 709
Riner, Virginia 24149
(540) 381-5177

The Corrective Action Plan will be submitted to the West Central Regional Office of the DEQ on June 30, 2015. If you would like to review or discuss the proposed Corrective Action Plan with the staff of the DEQ, please feel free to contact Douglas B. Carl, Remediation Specialist, (560) 562-6796, after the date of the Corrective Action Plan submittal. The DEQ Blue Ridge Regional Office will consider written comments regarding the proposed Corrective Action Plan until August 10, 2009, and may decide to hold a public meeting if there is significant public interest. Written comments should be sent to the DEQ at the address listed below. The DEQ requests that all written comments reference the tracking number for this case; PC 2014-2256.

Department of Environmental Quality
Storage Tank Program
Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, Virginia 24019

PUBLIC NOTICE VERIFICATION

PASTE PRINTED COPY OF NOTICE IN THIS AREA

I hereby certify that the notice attached in the space above appeared in Large Print Newspaper *The Enterprise* on this date.

_____ 19____

(Signature)

(Title)

_____ 19____
(Date)

THE ENTERPRISE

P O BOX 348, STUART, VIRGINIA 24171

I, Gail M. Harding, Publisher of The Enterprise, a newspaper published in the Town of Stuart, Patrick County, Virginia, do hereby certify that the attached Order of Publication was published in said newspaper for 2 consecutive weeks:

Beginning on the 3rd day of June 2015

Ending on the 10th day of June 2015

Given under my hand this 18th day of June 2015



Gail M. Harding Publisher

PUBLIC NOTICE PROPOSAL TO CLEANUP AN UNDERGROUND STORAGE TANK

UST SITE
There has been a release from a petroleum storage tank system located at:
Meadows of Dan Food Mart
2609 366 Stuart Highway
Meadows of Dan, Virginia
24120

The Department of Environmental Quality (DEQ) is requiring T&M, M of D, LLC to develop a Corrective Action Plan to address the cleanup of petroleum contamination at the site. If you have questions regarding the cleanup please contact:
Greene Environmental Services, LLC
206 Buckwheat Lane
Rocky Mount, Virginia 24151
(540) 483-3311

The Corrective Action Plan will be submitted to the Roanoke Branch of the Blue Ridge Regional Office of the DEQ prior to July 1, 2015. If you would like to review or discuss the proposed Corrective Action Plan with the staff of the DEQ please feel free to contact Douglas B. Carl, Remediation Specialist, (540) 562-6796, after the date of the Corrective Action Plan submission. The DEQ Blue Ridge Regional Office will consider written comments regarding the proposed Corrective Action Plan until August 10, 2015, and may decide to hold a public meeting if there is significant public interest. Written comments should be sent to the DEQ at the address listed below. The DEQ requests that all written comments reference the tracking number for this case, PC #2014-2256.
Department of Environmental Quality
Storage Tank Program
Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, Virginia 24019
(202) 53-6710